Annual Report NPDES Municipal Separate Storm Sewer System Permit

Published by the Montgomery County Department of Environmental Protection
for the Maryland Department of the Environment

ANNUAL REPORT
NPDES MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT MONTGOMERY COUNTY, MARYLAND

00-DP-3320 MD0068349

AUGUST 2003

Published by the Montgomery County Department of Environmental Protection for the Maryland Department of the Environment

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LIST OF ACRONYMS

BMP Best Management Practice

CIP Capital Improvement Project

COE U.S. Army Corps of Engineers

DEP Department of Environmental Protection

DNR Maryland Department of Natural Resources

DPS Department of Permitting Services

DPWT Department of Public Works and Transportation

EPA Environmental Protection Agency

GIS Geographic Information System

IBI Index of Biological Integrity

MDE Maryland Department of the Environment

SPA Special Protection Area

LIST OF FIGURES

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REFERENCES

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Roth, N.E., J.H. Vølstad, G. Mercurio, and M.T. Southerland. October 2002. Pilot Study for Montgomery County and Maryland DNR Data Integration: Comparison of Benthic Macroinvertebrate Sampling Protocols for Freshwater Streams. Prepared by Versar, Inc., Columbia, MD for U.S. Environmental Protection Agency, Mid-Atlantic Assessment Team.

ATTACHMENT A. COMPACT DISK WITH THE FOLLOWING ELECTRONIC FILES

MDENPDES02.mdb Required information in ACCESS 2000 database.
Urban Best Management Practices
NPDES Construction General Permits
Erosion and Sediment Control Responsible Personnel Training Certification
Illicit Discharge Program (and type codes)
Chemical Monitoring Site
Continuous Flow Monitoring
Chemical Monitoring Storm Event Data
Stormwater Programmatic Information
Stormwater Implementation Information

APPENDIX.doc Annual Report Databases

SWP3 folder (doc files) ANNUAL SITE ASSESSMENTS
Colesville Highway Maintenance Depot
Damascus Highway Maintenance Depot
Equipment Management Operations Center (EMOC)/Gaithersburg Highway Services
Gude Landfill
Oaks Landfill
Poolesville Highway Maintenance Depot
Seven Locks Facility
Silver Spring/Brookville Service Park
Transfer Station/Materials Recycling Facility (TSMRF)

cbp_usw_1-6-03datasub.pdf Chesapeake Bay Program Data Submission Form For Urban Storm Water BMP Data

epa_bio_ind_md.pdf Biological Indicator Variability and Stream Monitoring Program Integration: A Maryland Case Study

MBSS_ea01-9_mont.pdf Results of the 1994-1997 Maryland Biological Stream Survey in Montgomery County.

revised_responseguide03.doc DEP Emergency Response Manual (Revised, 2003).

SEDIMENT YEAR END REPORT-FINAL.doc
DEP evaluation of County's erosion and sediment control program during 2001.

VERSAR_BenthicComparison_1003.doc Pilot Study for Montgomery County and Maryland DNR Data Integration: Comparison of Benthic Macroinvertebrate Sampling Protocols for Freshwater Streams

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MONTGOMERY COUNTY MARYLAND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

I. BACKGROUND

This submission fulfills the requirement for an annual progress report to the Maryland Department of the Environment (MDE) as specified in Part V of Permit Number 00-DP-3320 MD0068349 (the Permit). The five-year Permit term began July 5, 2001, covering stormwater discharges from the municipal separate storm sewer system (MS4) in Montgomery County, Maryland. Significant accomplishments in the County's stormwater management program during the 2001 calendar year are highlighted in the Overview. The report itself has been organized based on the headings in the Permit's Section III. to document how specific required elements of the County's stormwater management program are being implemented.

The Montgomery County Department of Environmental Protection (DEP) has primary responsibility for the majority of the requirements of the Permit, including interagency coordination, annual reporting, source identification, discharge characterization, monitoring, stormwater facility inspection and maintenance enforcement, illicit discharge detection and elimination, watershed public outreach, and watershed restoration plans. The Department of Permitting Services (DPS) is responsible for the County's Stormwater and Sediment and Erosion Control Program. The Department of Public Works and Transportation (DPWT) is responsible for storm drains, road and roadside maintenance, solid waste disposal, and the General Permit for Storm Water Discharges Associated with Industrial Facilities at the County-owned vehicle and road maintenance facilities.

II. OVERVIEW

Source Identification

The Permit requires Montgomery County to inventory and map potential pollutant sources and means of conveyance into receiving streams and other water bodies. To comply, the County continues to update and enhance its Geographic Information System (GIS) capabilities for source identification, natural resources mapping, and program tracking. With this report, the DEP has submitted an updated storm drain coverage which includes an additional 214,146 linear ft. (40.6 miles) of storm drains and associated attributes, mainly from the older urban areas in the southern part of the County. Due to severe fiscal budget constraints during fiscal year 2003 (FY03), there was been a delay in completing the countywide update. The DPS intends to use existing staff and a new GIS position to begin scanning storm drain plans and creating an updated GIS layer by late fall of 2003, with a targeted completion date of spring 2005.

The comprehensive, geographically-referenced database that will allow access to all state and local permits is still under development. This database will have all available State information for NPDES municipal and industrial permits, air and hazardous waste permits, and underground storage tank locations, and will eventually incorporate the local emergency planning database and locations of outfalls with re-occurring discharges. As of December 2002, there were 14 municipal and 314 industrial sites with NPDES permits in the County.

Discharge Characterization

The Permit requires that "Montgomery County shall contribute to Maryland's understanding of stormwater runoff and its effect on water resources by conducting a monitoring program."

- During 2001, the Environmental Protection Agency (EPA) provided funding for a comparison study between the Maryland Biological Stream Survey (MBSS) and the DEP biological monitoring protocols. The EPA study determined that results using either approach were comparable despite the differences in collection technique, benthic macroinvertebrate subsampling techniques, and level of taxonomic identification. To assure greater consistency, the DEP protocols were modified to be consistent with the MBSS approach beginning with samples collected during the year 2002.

- During 2002, the DEP began paired outfall and instream integrated water chemistry , biological, and physical habitat monitoring in the Stewart-April Lane Tributary and Lower Paint Branch Mainstem.

    - Eight baseflow and six storm events were sampled from May through December 2002. The extended drought during 2001-2002 interfered with achieving the County's goal of once per month storm sampling.

    - Biological monitoring results for the Stewart-April Lane Tributary showed poor benthic macroinvertbrate and fish resource conditions for 1994, 2001, and 2002. Both of the mainstem stations showed fair benthic macroinvertebrate conditions. A detailed examination of benthic community structure and function showed significant differences

between the outfall and instream stations, and will be used as a more sensitive approach to track changes in the biological community as retrofit and restoration projects are completed.

- Fish resource conditions were excellent upstream and good downstream of the study tributary. There were no fish collected in the tributary during the three sampling years. Since there are no barriers to fish movement between the lower mainstem and the tributary, factors other than instream habitat in the tributary must be preventing viable fish communities.

- The first round of required monitoring to assess the State's Stormwater Design Manual was completed during summer 2003. The County is monitoring in the Clarksburg Town Center Tributary (test watershed) and comparing results from the Sopers Branch (control watershed). During 2003, the DEP finalized its protocols for the required geomorphic monitoring as adapted from the United States Fish and Wildlife Services publication on bankfull discharge and channel characteristics of Maryland piedmont streams (McCandless and Everett , 2002).

Management Programs

The Permit requires that the County maintain specific jurisdiction-wide management programs to control stormwater discharges to the maximum extent practicable. These include stormwater management facility inspection and maintenance, stormwater management permitting and plan review, sediment and erosion control enforcement, illicit discharge identification and elimination, stormwater pollution prevention plans for County-owned industrial facilities, and public outreach.

- FY03 was the first with revenues from the County's Water Quality Protection Charge (WQPC) for stormwater facility maintenance. In its first year, the DEP program focused on organization, establishing full staffing support, and outreach to homeowners' associations and the general public, as well as continuing required maintenance inspections and repairs. During FY03, the DEP staff and contractors completed 939 total inspections and determined that some sort of repair was needed at 99% of the above-ground structures and 71% of the underground structures.

- The DPS reported that the number of sediment control permits remained about the same in 2002 compared to 2001, but there was a significant decrease in acres developed. The acres developed with stormwater management compared to total developed acres increased significantly--from 1,256 of 2,125 acres in the year 2001 to 1,122 of 1,390 acres in the year 2002. In part, this reflects a reduction in number of projects exempt from stormwater management due to changes in State law (from 59 projects out of 886 permits issued in 2001 to 27 projects out of 890 permits issued in 2002).

- In January 2002, the DEP published the results of its field review of the ongoing DPS sediment and erosion control program, intended as a supplement to the regular triennial program review. Since then, the DPS has instituted procedures to increase awareness among staff and site managers to assure more effective installation and more routine maintenance of construction site practices, and to encourage better recordkeeping of site activities and project completion.

- During 2002, the DPWT continued its routine maintenance and pollution prevention responsibilities as required at the County-owned facilities covered under the General Permit for Stormwater Discharges from Industrial facilities. To address the existing issue of vehicle washing and the associated uncontrolled wastewater discharge, capital improvement project (CIP) funds have been proposed so that by FY08, there should be funding for facility renovations that would include indoor vehicle wash facilities.

- The DEP continues to be the lead County agency for providing residents, business owners, and resource users with timely information on watershed management, environmental issues, and cross-media pollution prevention. The Environmental Partners Program for business community outreach was recognized as an "Honorable Mention" under the Customer Service Category for the 2002 Montgomery's Best Honor Awards Program. By convincing one regional tire and automotive service company to switch from petroleum-based solvent parts cleaning units to new aqueous parts cleaning units, there is an anticipated elimination of 36.3 tons of smog-forming volatile organic compounds (VOCs) from the region's atmosphere per year and elimination of potential spills of toxic solvents.

Watershed Restoration

The Permit requires that the County continue its systematic assessment of water quality within all of its watersheds and to maximize water quality benefits in priority subwatersheds using efforts that are definable and the effects of which are measurable. The County program integrates biological monitoring and physical habitat assessments with stormwater retrofit and stream restoration opportunities, water quality discharge law enforcement, and public outreach and involvement. This approach leads to pollution prevention and project construction efforts that are watershed-based and that will provide water quality benefits to the maximum extent practicable.

- During 2002, the Watts Branch Watershed Restoration Study began, the last required in the previous five-year Permit; stormwater management was added at one already developed site and three stream restoration projects were completed in the Anacostia Watershed. About 40% of the County's total acreage, and the majority of its developed areas, have been covered under Watershed Restoration Studies begun since 1996. Total cost to date (including State and Federal cost-share funding) for watershed studies, stormwater retrofits, and stream restoration projects completed or in design has been $22.34 million dollars. Of this, $0.5 million of funding has been allocated for new projects to get underway**.**

- In 2001, the MBSS published results for its monitoring program from 1994 to 1997 in Montgomery County. The MBSS results for nitrate (NO3) were combined with those from the DEP synoptic nutrient surveys in 1998 and 1999 to evaluate pattern of baseflow NO3 concentrations across the County. Consistently, lower NO3 values were found in the the southern and eastern, more developed sections of the County, while the highest values (greater than 3 mg/l) were found in the western, more rural and agricultural sections of the County. This pattern must be considered when setting priorities for controlling nitrogen loads.

- The DEP continued its countywide screening for biological impairments during 2002. Eight of 45 stations (18%) showed impairment from other than physical habitat factors. Drought impacts were evident as low streamflow during the summer throughout the County, and some stations

intended for monitoring could not be fished. Follow-up recommendations include coordination with the City of Gaithersburg for two of the stations in Muddy Branch and additional field investigations by the DEP for source identification at the other impaired stations.

- During 2002, pre-construction monitoring was conducted at six stations in the Turkey Branch, the watershed selected to meet the Permit-required restoration goal. The overall watershed stream condition is "poor". Post-construction monitoring will take place one year, three years, and then five years after completion of the projects (scheduled for winter/spring 2004) to assess changes in stream condition.

Program Funding

The Permit requires that Montgomery County submit each year a fiscal analysis of the capital, operation, and maintenance expenditures necessary for compliance. During FY03, the County spent $11.012 million for these programs and has budgeted $11.784 million for FY04. Despite the existing and anticipated declines in County general revenues, there is a slight increase in FY04 budgeted funding to support Permit-required programs. With WQPC revenues, expenditures for stormwater facility maintenance repairs are expected to increase from $1.005 million in FY03 to $2.729 million in FY04.

Assessment of Controls

The Permit requires an estimate of expected pollutant load reductions as a result of implemented stormwater management programs. In January 2002, the Chesapeake Bay Program (CBP) published new guidelines to increase consistency in reporting and accounting for nutrient reductions from urban storm water management practices. A comparison between the reductions for the year 2001 using the CBP guidelines with those reported in the County's Annual Report for 2001 showed significantly less precent reductions and thus more nutrients being carried downstream. Using the County's previous approach, percent reduction from existing stormwater controls was estimated as 16.3% for nitrogen and 22.4% for phosphorus, while the DNR approach estimated reductions of only 6.5% for nitrogen and 8.6% for phosphorus. These differences were attributed to lower percent pollutant removal efficiencies and lower estimated percent acres developed with controls, and higher per acre average loadings using the CBP approach compared to the County's more specific information.

For consistency with the Tributary Strategies process, the County will use the CBP guidelines for removal efficiencies in future pollutant load reduction calculations. However, the County will continue to use locally-specific loading factors for uncontrolled watersheds since these more accurately reflect local runoff contributions. As the information in the County's stormwater management facility database becomes more complete, particularly for drainage area controlled, the estimates for acres controlled should become identical between the two approaches. Stream restoration and non-structural practices such as pollution prevention and public outreach will be taken into account as quantitative data becomes available from ongoing research.

III. STANDARD PERMIT CONDITIONS

A. Permit Administration

An updated organization chart and contact information is shown in Table III-A and included electronically on CD in Attachment A.

B. Legal Authority

The required legal recertification was submitted to MDE in January, 2002.

C. Source Identification

C1. Geographic Information System (GIS) Data Layers

Montgomery County continues the development and updating of its geographic information system (GIS) data layers. An updated submission for the County's storm drain system is included in electronic format on CD in Attachment A. This includes an additional 214,146 linear ft. (40.6 miles) of storm drains and associated features, mainly within the older, urban areas in the southern part of the County. The updated GIS layer is a working file and has incomplete attribute information, but storm drain locations are accurately represented. Examples showing geologic features, land use, resources, infrastructure, and significiant discharges have been submitted with previous annual reports as required.

C2. Storm Drain System Drainage Areas

The DPS received $100,000 in its FY' 03 budget to bring a consultant on board to update the existing GIS Storm Drain Inventory Database, including drainage area delineations. However, due to severe fiscal budget constraints experienced this year by both State and County agencies, the appropriated funds to complete this update had to be cut in order to achieve a required countywide cost savings plan. The DPS is currently in the process of filling an approved GIS position by the summer of 2003 whose primary responsibility will be the incorporation of the storm drain data base into GIS format. Using existing staff and the new GIS position, the DPS intends to pursue updating the storm drain inventory through an in-house staff effort. A tentative schedule would begin scanning storm drain plans and creating a GIS layer by late fall of 2003, with a targeted completion date of spring 2005.

C3. Mapping of New Pollutant Sources

The comprehensive database that will allow access to all state and local permits is still under development. This database will have all State permit information for NPDES, air, hazardous waste, and underground storage tanks and will eventually incorporate the local emergency planning database and reoccurring discharge points using GIS and global positioning satellite technology.

Table III-A. Organziation Chart for Montgomery County Permit-Required Programs

MS4 PERMIT SECTION	RESPONSIBLE PARTY			Updated August 2003		
Part III. Standard Permit Elements	***Department***	***Name***	***Title***	***Divison***	***Address***	***Telephone***
A. Organization Chart	*Department of Environmental Protection*	Meosotis Curtis	*Senior Planning Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7711
B. Legal Authority	*Office of the County Attorney*	Walter Wilson	*Associate County Attorney*		101 Monroe St. 3rd Flr. Rockville MD 20850	240-777-6759
C. Source Identification						
GIS development and update	*Department of Environmental Protection*	Christopher Bingley	*Manager*	Director's Office	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7721
GIS for storm drain system	*Department of Permitting Services*	Joe Cheung	*Manager*	Division of Land Development Services	255 Rockville Pike, 2nd floor, Rockville MD 20850	240-777-6299
GIS for Stormwater Management Facilities	*Department of Environmental Protection*	Boyd Church	*Chief*	Division of Environmental Policy and Compliance	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7760
Urban Best Management Practices Database	*Department of Environmental Protection*	Christopher Bingley	*Manager*	Director's Office	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7721
D. Discharge Characterization						
Long-term Monitoring:						
Water Chemistry Monitoring	*Department of Environmental Protection*	Meosotis Curtis	*Senior Planning Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7711
Biological and Physical Habitat Monitoring	*Department of Environmental Protection*	Keith Van Ness	*Senior Water Quality Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7726
Design Criteria Evaluation	*Department of Environmental Protection*	Keith Van Ness	*Senior Water Quality Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7726
	Department of Permitting Services	Leo Galanko	*Permitting Services Specialist*	Division of Land Development Services	255 Rockville Pike, 2nd floor, Rockville MD 20850	240-777-6242
E. Management Programs						
Stormwater Facility Inspections and Maintenance	*Department of Environmental Protection*	Boyd Church	*Chief*	Division of Environmental Policy and Compliance	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7760
Stormwater Management Permitting and Plan Review	*Department of Permitting Services*	Richard Brush	*Manager*	Division of Land Development Services	255 Rockville Pike, 2nd floor, Rockville MD 20850	240-777-6343
Illicit Connection Detection and Elimination Program	*Department of Environmental Protection*	David Rotolone	*Field Program Manager*	Environmental Policy and Compliance Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7753
County Facility Stormwater Permit Compliance	*Department of Public Works and Transportation*	Al Roshdieh	*Division Chief*	Division of Operations	101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878	240-777-6000
Illegal Dumping and Spills	*Department of Environmental Protection*	David Rotolone	*Field Program Manager*	Division of Environmental Policy and Compliance	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7753
Erosion and Sediment Control	*Department of Permitting Services*	Michael Reahl	*Manager*	Division of Land Development Services	255 Rockville Pike, 2nd floor, Rockville MD 20850	240-777-6344
Public Outreach and Education:						
Watershed Outreach	*Department of Environmental Protection*	Diane Davis	*Planning Specialist III*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7714
Environmental Outreach and DEP Web Site	*Department of Environmental Protection*	Joseph Keyser	*Environmental Education Coordinator*	Director's Office	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7720
Road and Roadside Maintenance Pollution Reduction Plan	*Department of Public Works and Transportation*	Tom Orr	*Section Chief*	Division of Operations	50 Maryland Ave. Rm 114, Rockville MD 20850	240-777-7601
Pollution Reduction Plan and Compliance for County Government Departments	*Department of Public Works and Transportation*	Al Roshdieh	*Division Chief*	Division of Operations	101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878	240-777-6000
Pollution Prevention Program	*Department of Environmental Protection*	Ligia Moss	*Senior Engineer*	Environmental Policy and Compliance Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7756
F. Watershed Restoration						
Countywide Monitoring	*Department of Environmental Protection*	Keith Van Ness	*Senior Water Quality Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7726
Assessments and Project Implementation	*Department of Environmental Protection*	Daniel Harper	*Manager*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7709
G. Program Funding	*Department of Environmental Protection*	Cameron Wiegand	*Division Chief*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7736
H. Assessment of Controls	*Department of Environmental Protection*	Meosotis Curtis	*Senior Planning Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7711
Part IV. Special Programmatic Considerations	*Department of Environmental Protection*	Meosotis Curtis	*Senior Planning Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7711
Part V. Annual Reports	*Department of Environmental Protection*	Meosotis Curtis	*Senior Planning Specialist*	Watershed Management Division	255 Rockville Pike, Ste 120, Rockville MD 20850	240-777-7711

In the interim, the DEP has obtained from MDE's industrial permits program an updated list of NPDES-permitted municipal and industrial facilities in the County and created a GIS data layer of their locations. As of December 2002, there were 14 municipal and 314 industrial sites with NPDES permits in the County. These sites are included in a spreadsheet on CD in Attachment A.

C4. Urban Best Management Practices

The database included in electronic format on the CD in Attachment A uses the format required for the MDE's Urban Best Management Practice (BMP) Database. There are 3,499 records in this database which include each facility on a site. Multiple facilities on a site share the same integer for structure number (STRU_NO) but different non-integer number (e.g. STRU_NOs 18 and 18.2 are on the same site). Much of the information remains missing for the facilities constructed prior to the County's first NPDES MS4 Permit (1996), but information is continually being updated through the maintenance inspections and drainage area delineation program.

D. Discharge Characterization

The permit requires that "Montgomery County shall contribute to Maryland's understanding of stormwater runoff and its effect on water resources by conducting a monitoring program." The locations of the County stations and watersheds in which Permit-required monitoring took place during the year 2002 are shown in Figure III-D1.

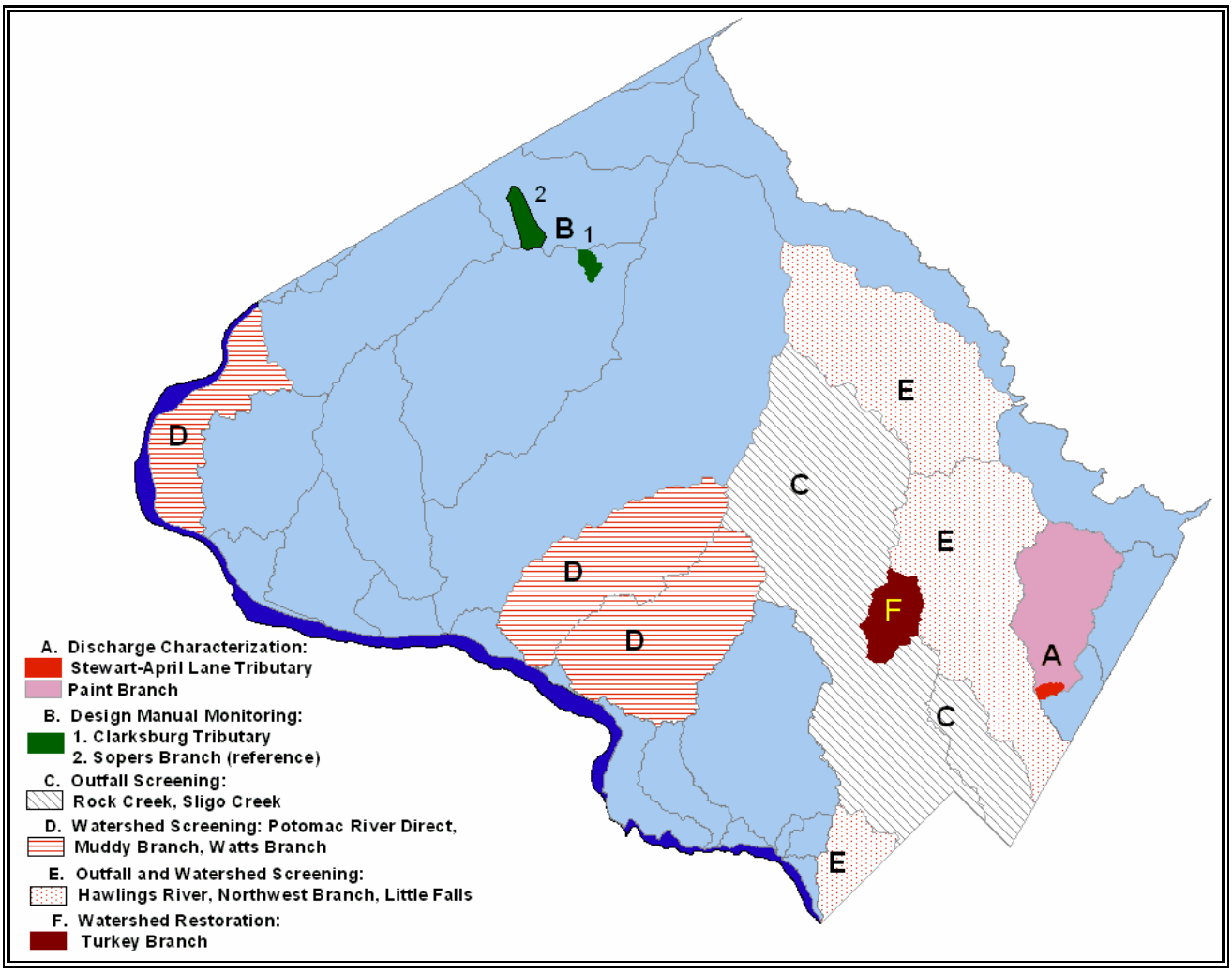
D1. Outfall and Instream Monitoring

During 2002, the County began its paired outfall and instream monitoring in the Stewart-April Lane Tributary and Paint Branch Mainstem. Station locations, contributing drainage areas, and physical characteristics for the integrated water chemistry, biology, and physical stream assessments are shown in Figure III-D2.

This reach in the Lower Paint Branch has been monitored as part of the Countywide program since 1994. There are three biological monitoring stations being used to identify baseline stream resource conditions and document changes after a new stormwater management is constructed at the head of the Stewart-April Lane Tributary. These are: PBPB104 in the lower end of the Stewart/April Lane Tributary; PBPB309B-Paint Branch mainstem just upstream of study tributary; and PBPB310A--Paint Branch mainstem just downstream of study tributary.

The outfall station is located on the Stewart April Lane Tributary about 200 feet downstream from the proposed stormwater management facility. The Permit-required monitoring is being conducted by Versar, Inc.. who also conducted pre-retrofit construction monitoring on this tributary in 1998-1999 under contract to the U.S. Army Corps of Engineers (USCOE). The instream station is on Paint Branch approximately 200 feet below the confluence of Paint Branch and the Stewart April Lane Tributary.

FIGURE III-D1. Stations and Watersheds for Permit Required Monitoring during 2002.

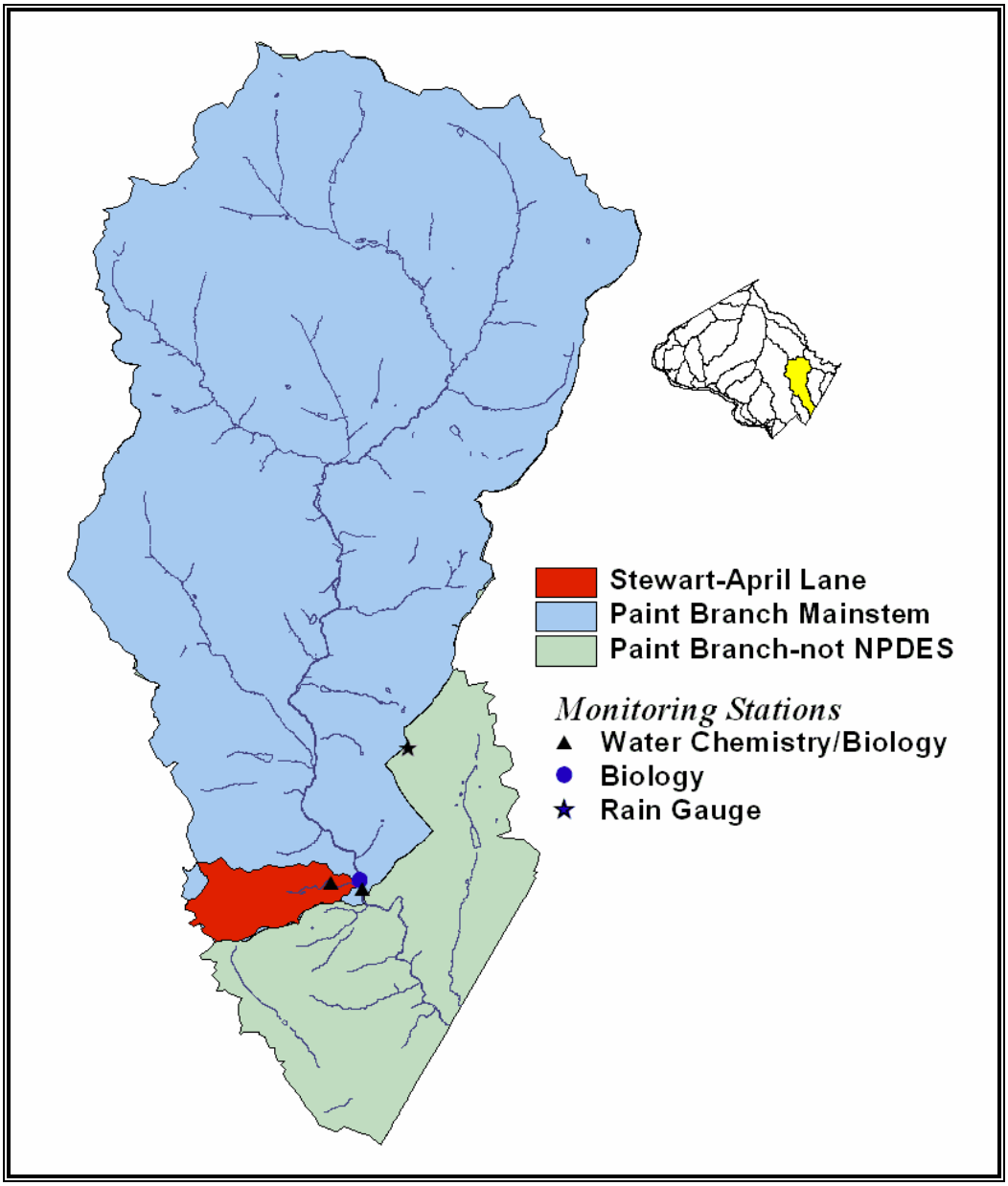


Section III-D. Discharge Characterization
Long-Term Monitoring: Stewart-April Lane Tributary and Paint Branch Mainstem.
Design Manual Monitoring. Clarksburg Special Protection Area Tributary and Sopers Branch

Section III-E. Management Programs
Outfall Screening: Rock Creek, Sligo Creek, Hawlings River, Northwest Branch, Little Falls

Section III-F. Watershed Restoration
Watershed Screening for Impairments. Potomac River Direct.Hawlings River, Northwest Branch, Little Falls, Muddy Branch, Watts Branch
Watershed Restoration: Turkey Branch

Figure III-D2. DrainageAreas and Monitoring Stations for Outfall (Stewart-April Lane Tributary) and Instream (Paint Branch Mainstem) Stations.



Drainage Area Characteristics	PERCENT				Total Acres	Stream miles
	Impervious	Woods	Cropland	Lawn/ Open Land		
Outfall: Stewart-April Lane Tributary	38.7	21.3	0.0	40.0	223.4	0.6
Instream: Paint Branch Mainstem	13.0	26.6	3.4	57.0	7,734.0	31.5

Continuous flow readings are being recorded at both the outfall and instream sites. There were concerns about possible vandalism in the open areas closest to the monitoring stations so the tipping bucket rain gauge was established at the Washington Suburban Sanitary Commision (WSSC) Laboratory Facility, only about a mile directly north of the monitoring stations. The WSSC is providing laboratory analytical services for all County monitoring programs.

D2. Stormwater Design Manual Monitoring

The small watershed selected for this monitoring is in the Clarksburg Town Center (location B-1 in Figure III-D1) north and west of Gaithersburg, with an anticipated build-out of 30% imperviousness but subject to the County's more stringent review and performance goals for a Special Protection Area. Information on the selection process was submitted to MDE in February 2002 and approved in March 2002. Conditions in this test watershed will be compared with those in a similar-sized control watershed, i.e. one not expected to show significant land cover changes over time.

The study watersheds and monitoring stations are shown in Figure III-D3. An equal number of stations have been selected in both the test and control watersheds, based on similar slope, drainage area, and geomorphic features. The control watershed is located on Sopers Branch of the Little Bennett Creek watershed within the County's Little Bennett Regional Park. The monitored drainage area is about 230 acres. The control watershed is slightly north of the test watershed, draining to the Monocacy River.

The test watershed includes an unnamed tributary to the Little Seneca Creek. Predominant land use is cropland, with forested stream buffers of varying widths. Total drainage is about 150 acres, with less than 35 acres of low density, single-family residential development mostly along the northern fringe. As of summer 2003, about 55 acres had been cleared and graded along the east side. This site has required erosion and sediment control measures in place and post-construction stormwater management will be consistent with the new State design manual criteria to protect the channel, groundwater recharge, and water quality.

During 2002, land cover in both watersheds was predominately forest and agricultural fields. Contributing land uses to each of the four monitoring stations within both the test and control areas are presented in Table III-D1, along with the cumulative drainage area to each monitoring station. Any changes in land uses will be presented in future reports.

Geomorphic Monitoring

The monitoring protocol for the geomorphic monitoring was adapted from the United States Fish and Wildlife Services (USFWS) publication on bankfull discharge and channel characteristics of Maryland piedmont streams (McCandless and Everett , 2002). The protocol was field tested in the study watersheds and revised for local conditions during the 2003 field season.

Figure III-D3. Drainage Areas and Monitoring Stations for the Design Manual Monitoring.

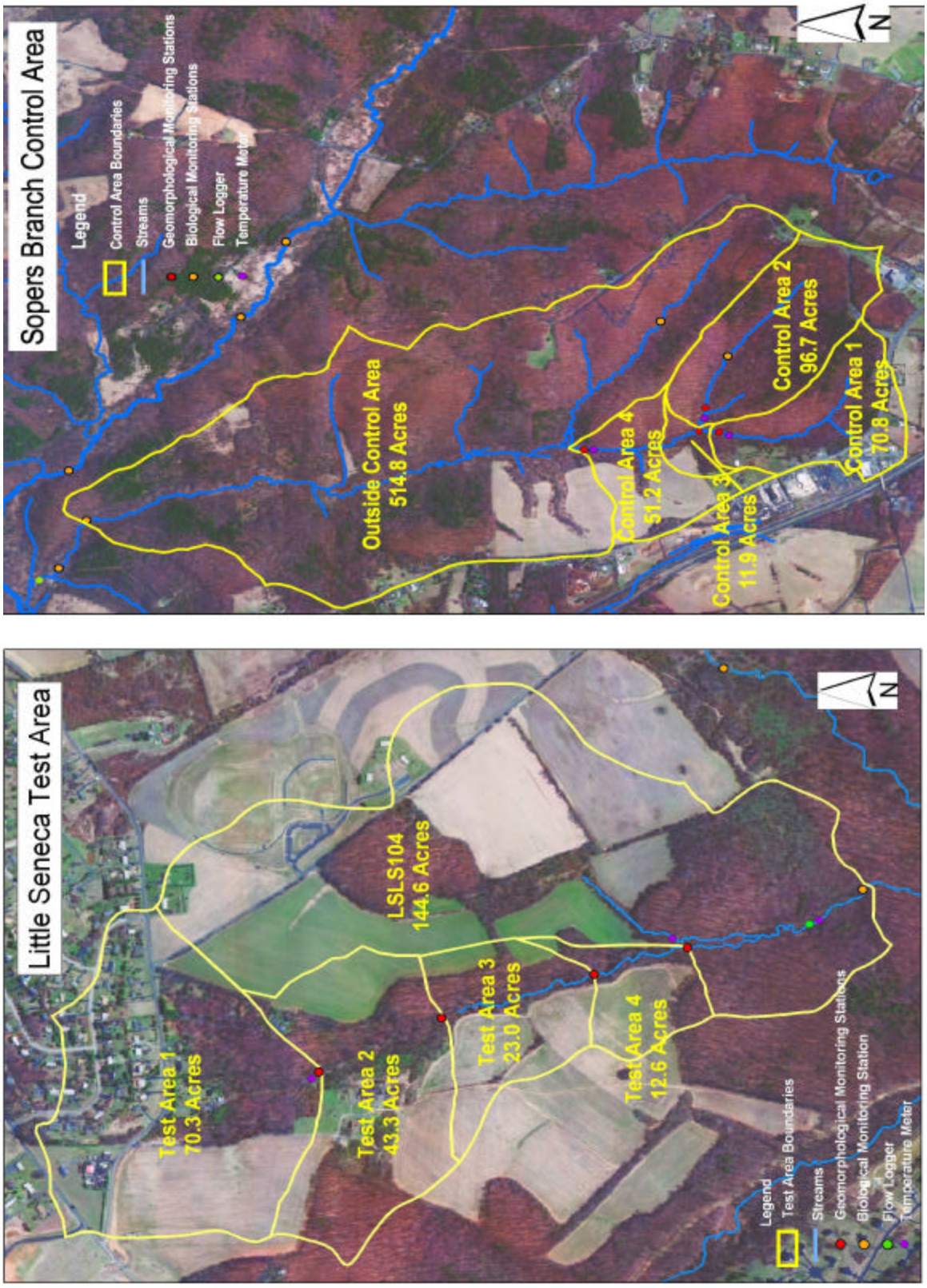


Table III-D1. Land Uses in theStudyWatersheds.

Little Seneca (Test Watershed)				
	Area in Acres			
LAND USE	1	2	3	4
lawn+field	32.18	10.50	3.02	0.66
parking	0.82	0.46		
woodlands	14.64	15.21	6.76	4.21
roads	1.93			
pasture	19.11	10.14		
buildings	1.59	0.26		
cropland		6.68	13.19	7.77
Area DA	70.27	43.25	22.97	12.64
Cum. DA	70.27	113.52	136.49	149.13
Sopers Branch (Control Watershed)				
	Area in Acres			
LAND USE	1	2	3	4
lawn+field	27.52	7.30	0.81	4.20
parking	2.17	0.16	0.02	0.21
woodlands	35.30	87.86	7.21	18.50
roads	1.90	1.33		0.85
pasture	3.26	0.03		1.26
buildings	0.67			0.04
cropland		0.03	3.87	26.14
Area DA	70.81	96.71	11.90	51.19
Cum. DA	70.81	167.51	179.42	230.61

Monitoring areas in the test watershed were located so as to have storm drain outfalls discharge either above or below the longitudinal profile area to the extent possible. Drainage areas were delineated for each watershed, and then the bankfull height, width, and cross-sectional area were calculated using the rating curves and curve equations found in the USFWS publication. These are shown in Table III-D2. These calculated bankfull dimensions were then used to identify field indicators and establish bankfull height where possible for the study areas.

A longitudinal profile consisting of 20 field determined bankfull widths (a minimum of two full meanders) was surveyed for each study area. Each profile included slope, maximum pool depth, and number and lengths of riffles, pools and runs. Pebble counts were done for each profile, in ten transects proportioned according to percent of riffle, pool, and runs along the profile.

All transects for the longitudinal profiles were conducted at bankfull level. Sinuosity was measured using stream length to valley length measurements. One cross-section was established within each profile to determine cross-sectional area and dimension, flood prone width, entrenchment, and bankfull area. Other cross-sections were established in meander pool sections and other areas as needed to fully capture the variability of the profile. Analysis will be presented in next year's Annual Report.

Table III-D2. Bankfull dimensions of Test and Control Areas for Design Manual Monitoring. Summer 2003.

PARAMETER	Clarksburg Town Center (test)				Soper's Branch (control)			
Stream Segment	1	2	3	4	1	2	3	4
Drainage Area (Acres)	70.3	113.5	136.5	149.1	71	96.7	179.4	230.6
Drainage Area (sq. miles)	0.11	0.18	0.21	0.23	0.11	0.15	0.28	0.36
Mean Depth (ft)	0.56	0.66	0.69	0.72	0.56	0.62	0.77	0.83
Width (ft)	6.25	7.57	8.04	8.33	6.27	7.07	9	9.93
Area (ft2)	3.48	4.98	5.58	5.96	3.5	4.38	6.88	8.27
Total Longitudinal Length (m)	48.5	49.7	71.4	132.8	37.6	38	82	63
Number of Cross Sections	2	2	2	2	2	2	2	2

Modeling the Selected Watershed

The Permit requires that a hydrologic and/or hydraulic model be used to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry. The DPS is requiring the developers within the test area to prepare and run a TR-20 model to compare pre-development and post-development runoff. The model requires identification of existing and proposed land uses, impervious area, and stormwater management to predict post-development runoff. Site design and stormwater management plans have been approved for one of the two significant developments proposed for the test watershed. First model run has been deferred until the second development project has advanced far enough in the design and approval process that its proposed stormwater management facilities can be accurately reflected in the model set up.

For streamflow data, the DEP has begun working with the United States Geological Survey (USGS)-Baltimore Office and EPA-Reston to establish and maintain two real time streamflow gauges, one in each watershed. This continuous flow information will document existing, pre-development flow conditions and track changes in flow pattern or volume as the test watershed is developed. The EPA-Reston has committed to provide funding for installation of these gauges. The USGS-Baltimore Office has agreed to train County staff in how to establish and maintain gauge stations and transfer and analyze stream flow data using USGS qa/qc standards. A minimum of two gauges are planned and should be installed by the end of September, 2003.

A rain gauge will be installed midway between the test and control watersheds to better evaluate changes in stream flow to rainfall response. The DEP has requested access to install and maintain the gauge within the County's Little Bennett Regional Park Maintenance Yard compound and anticipates installation during August 2003

Additional Monitoring to Evaluate Stream Changes

In addition to the Permit-required monitoring to assess stream channel changes, there are other ongoing monitoring programs to evaluate responses by the biological community and in other physical factors. Preliminary data analysis will be included with next year's Annual Report.

The DEP first conducted biological monitoring in 1998 in the test watershed and in 1995 in the control watershed. During spring 2002, benthic macroinvertebrate sampling was completed in both the control and test watersheds but the record drought and low streamflows prevented fish sampling. Fish sampling was re-scheduled for summer 2003. There is also ongoing monitoring of the amphibian populations in the study areas by staff from the USGS Patuxent Wildlife Research Center. This monitoring could provide data on the link between watershed changes and fauna with differing aquatic and terrestrial habitat needs depending on phase in their life cycles.

Groundwater wells and water temperature will also be monitored. Twenty five groundwater wells have been established in the test watershed through the SPA program requirements. Six continuous recording temperature meters have been installed (three in the test, three in the control watershed).

D3. Permit Monitoring Activities during 2002

Water Chemistry

The Quality Assurance and Quality Control Document (QA/QC) for Water Chemistry Monitoring for the County's program was submitted in 2001 with the detailed information on station selection, sampling equipment and protocols, database management, and contact information for field, laboratory, and County management staff. Table III-D3 lists the parameters, methods, and method detection limits, and indicates the availability of USCOE pre-construction data for comparison. The USCOE data will be used along with the Permit-required data to characterize the uncontrolled runoff from the subwatershed and to contrast with post-construction results.

The first samples for long-term discharge characterization in the Stewart-April Lane Tributary (outfall) and in Lower Paint Branch mainstem (instream) were taken in May 2002. Flow monitoring, baseflow, and storm event water chemistry data collected during 2002 for the outfall and instream stations are included in the electronic database submitted on the CD in Attachment A. During 2002, laboratory analyses were conducted for eight baseflow samples (May through December) at both stations; five of six storm events from May through December at the outfall and six storm events at the instream station.

TABLE III-D3. Permit-required Parameters, Methods, Methods Detection Limits, and Monitoring by USCOE for Long-Term Discharge Characterization.

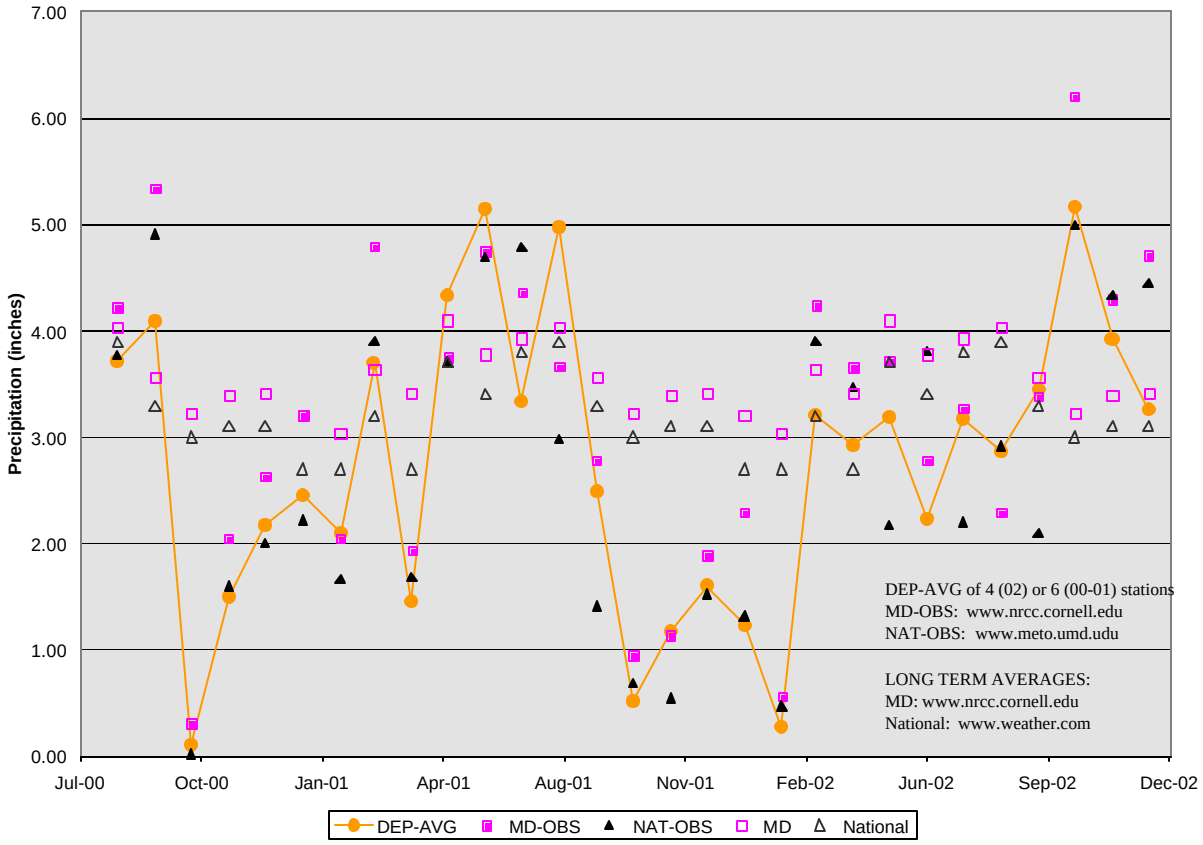
Parameter	WSSC* method	WSSC MDL	USCOE (1998-1999)
Fecal Coliform	SM9221 B	1.1/100 mL	✓
Biochemical Oxygen Demand 5 Day	SM 5210 B	1.0 mg/L*	
Hardness	SM2340 C	1.0 mg/L*	
Nitrate+Nitrite	L10-107-04-1-A	0.015 mg/L	✓
Total Kjeldahl Nitrogen	L10-107-06-2-D	0.08 mg/L	✓
Total Petroleum Hydrocarbons	EPA 1664A	5.0 mg/L	
Total Phenols	EPA 420.1	<0.01 mg/L	
Total Phosphorus	L10-115-01-1-E	0.021 mg/L	✓
Total Suspended Solids	SM 2540 D	1.0 mg/L	✓
Total Cadmium	EPA 200.8	0.6 µg/L	
Total Copper	EPA 200.8	1.2 µg/L	✓
Total Lead	EPA 200.8	0.4 µg/L	
Total Zinc	EPA 200.8	3.4 µg/L	✓

* Most currently available, SM=Standard Methods, L=Lachate Instrument Methods, and EPA=Environmental Protection Agency
USCOE=United States Army Corps of Engineers

In 2000, the DEP established six rain gauge stations in watersheds with ongoing restoration activities (Paint Branch, Northwest Branch, Cabin John, Upper and Lower Rock Creek, and the Hawlings River). The data from these stations would be used for evaluating changes in response of streamflow to rainfall over time. The stations were reduced to four during 2002, eliminating the Hawlings River and Upper Rock Creek sites.

The average of data collected from the DEP stations (six stations in 2000-2001, four stations in 2002) is compared with that reported for National Airport and the average across Maryland in Figure III-D4. The extended drought from spring 2001 lasted to October 2002, clearly discerned as the below average monthly rainfall at National Airport and across Maryland and the similar pattern at the DEP stations. The goal of one successful storm sampling per month could not be achieved during 2002 due to the reduced number of events and amount of precipitation.

Figure III-D4. Comparison of Monthly Precipitation at the DEP rain gauge network with National Airport and State of Maryland Average.



An additional factor affecting storm sampling was the increased specificity for qualifying storm events which was implemented to eliminate sampling of the higher frequency, but small storm events which did not contribute significant loads. For this Permit period, qualifying rainfall events must be at least one-half hour in duration. One of the rainfall events in any quarter must be of at least 0.3" in quantity in a 24-hour period and at least two in any quarter must be of at least 0.6" in quantity in a 24-hour period. Melting snow may count as a valid storm event provided the equivalent quantity in rain inches meets the above requirements.

Dates of sampling and associated information are shown in Table III-D4. Stormflow volumes shown are preliminary, as the rating curves for the outfall and instream stations still need to be finalized. Stormwater retrofit construction is anticipated during 2004. Pre-construction data analysis will be included in the Annual Report for 2003 after completing at least 12 months of sampling.

Table III-D4. Storm Events Sampled During 2002.

Station	Date	Rainfall Depth (inches)	Duration (hours)	Intensity (inches/hours)	Stormflow Volume (cubic feet)
OUTFALL	5/3/02	0.83	28	0.03	90,709
OUTFALL	8/30/02	2.34	46	0.05	238,954
OUTFALL	10/12/02	1.75	50	0.04	328,340
OUTFALL	10/29/02	1.19	55	0.02	96,323
OUTFALL	12/12/02	0.65	41	0.02	193,450
INSTREAM	5/3/02	0.83	28	0.03	7,503,039
INSTREAM	6/28/02	0.38	14	0.03	1,353,910
INSTREAM	8/30/02	2.34	63	0.04	1,0740,410
INSTREAM	10/12/02	1.75	79	0.02	7,378,805
INSTREAM	10/29/02	1.19	65	0.02	10,000,320
INSTREAM	12/12/02	0.65	68	0.01	19,151,900

Biological and Physical Habitat Monitoring

Change in Monitoring Methods Since Last Permit Period

The DEP biological and physical habitat monitoring protocols (1998) approved by MDE during the last permit period differed from those followed by the MBSS. The MBSS approach was used in defining the State's first biocriteria and is now followed by all other NPDES MS4 local governments. However, the DEP was concerned that changing from the protocols used for over six years of sampling would create difficulties in using that data for long-term trends analysis.

During 2001, the EPA provided funding for a comparison study between the MBSS and the DEP protocols. The study produced two reports prepared by Versar, Inc. for the EPA Office of Environmental Information and the Mid-Atlantic Integrated Assessment (MAIA) Program. These reports are included in electronic format on CD in Attachment A. The results from that study were used in modifying the DEP protocols to be consistent with the MBSS approach, beginning with samples collected during the year 2002.

Study Results and Protocol Changes

The EPA study determined that results using either the DEP or MBSS approach were comparable despite the differences in collection technique, benthic macroinvertebrate subsampling techniques, and level of taxonomic identification.

- The Fish Index of Biological Integrity (FIBI) scores calculated from two passes (the MBSS approach) were highly correlated with FIBI's based on three passes (the DEP approach) and narrative ratings (good, fair, poor) were nearly unchanged. Given the reduced sampling effort

required for similar results, the DEP changed its fish sampling methods to the two-pass method which is consistent with the MBSS approach.

- The mean Benthic Index of Biological Integrity (BIBI) scores by stream order and land use were similar whether samples were collected using the standard MBSS 20-jab D-net method or the DEP kick seine protocols. The DEP changed its benthic macroinvertebrate sampling methods to the MBSS method to be consistent in the future, but the EPA study confirmed comparability with data collected previously using the kick seine protocol.

- There was no significant difference in BIBI scores calculated using the D-Net with "100-organism" compared to the Kick Seine "200 organism" subsamples. Given similar results with decreased effort, the DEP changed to the "100-organism" subsample method which is consistent with the MBSS approach

- The study showed that the identification of chironomids (midges) and oligochaetes (unsegmented worms) to tribe, in conjunction with an appropriate increase in the number of sampling sites (approximately 10 percent) necessary to assess a Maryland eight-digit watershed (10-15 stations) could yield a level of precision in mean BIBI scores similar to results from identification to genus. Identification to genus requires a significant additional level of effort. The BIBI precision was only moderately improved by identifying chironomids to genus. To achieve comparability of BIBI scores with those using the MBSS approach, the DEP has begun identifying chironomids to tribe.

Results of Biological Monitoring

Currently, the DEP has biological data from three years at tributary station PBPB104 and one year at mainstem stations PBPB309B (upstream) and PBPB310A (downstream). Biological monitoring was first completed in 1994 for fish and 1995 for benthic macroinvertebrates at station PBPB104. The location of PBPB104 was moved approximately 100 meters downstream in 2001 because of construction which connected Stewart Lane with Lockwood Drive. Both fish and benthic macroinvertebrates were sampled there during 2001. In 2002, fish and benthic macroinvertebrates were sampled at all three stations. The BIBI and FIBI results are shown in Figure III-D5.

Index of Biological Integrity (BIBI) Results

The BIBI scores differed little between the tributary (PBPB104) and mainstem stations (PBPB309B and PBPB310A). The BIBI scores were in the poor range for all three years of sampling in the tributary. The 1995 BIBI score defaulted to poor because less than 100 individuals were found in the sample. The BIBI scores for both Paint Branch mainstem stations were in the low fair range. Although the BIBI scores differed only slightly between the tributary and the Paint Branch mainstem, there were noticeable differences in community structure and function. These differences are discussed in greater detail in the following section.

THE FIBI scores differed greatly between the study tributary and the Paint Branch mainstem. The FIBI scores were in the poor range for the study tributary, where no fish were collected during any of the three years sampled. The FIBI scores were in the excellent range for the Paint Branch mainstem upstream and in the good range for the mainstem downstream of the study tributary.

There are no barriers to fish movement downstream of the study tributary, and there is apparent fish habitat within this reach. The absence of fish in three different monitoring years in the tributary, but present both upstream and downstream on the mainstem, indicated that factors other than instream habitat in the tributary were preventing viable fish communities.

Benthic Community Structure and Function Differences

Eight measurements of community structure and function make up the DEP's BIBI. These include functional feeding groups (FFGs), taxa richness, diversity, composition, and pollution tolerance. All measurements respond in predictable ways to increasing levels of stressors. Examining the details of the benthic communities provides more information on possible impairing factors than available just from the narrative ranking based on the BIBI score.

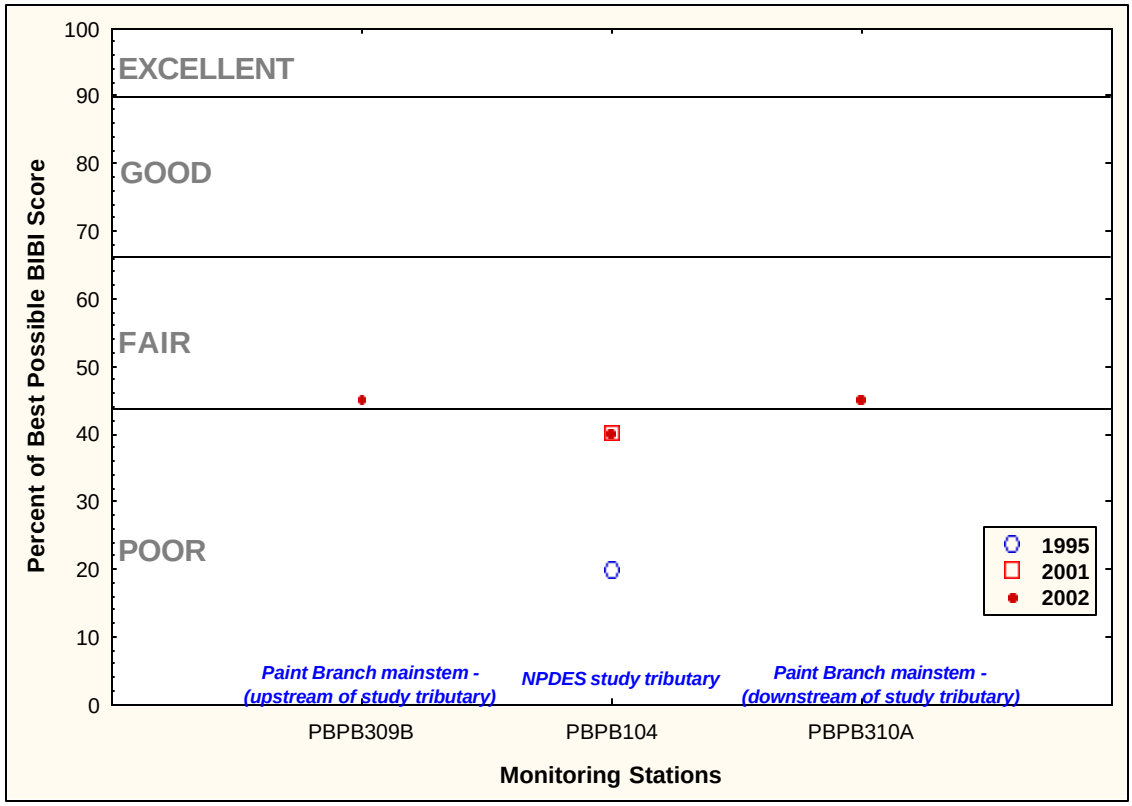
Functional Feeding Groups

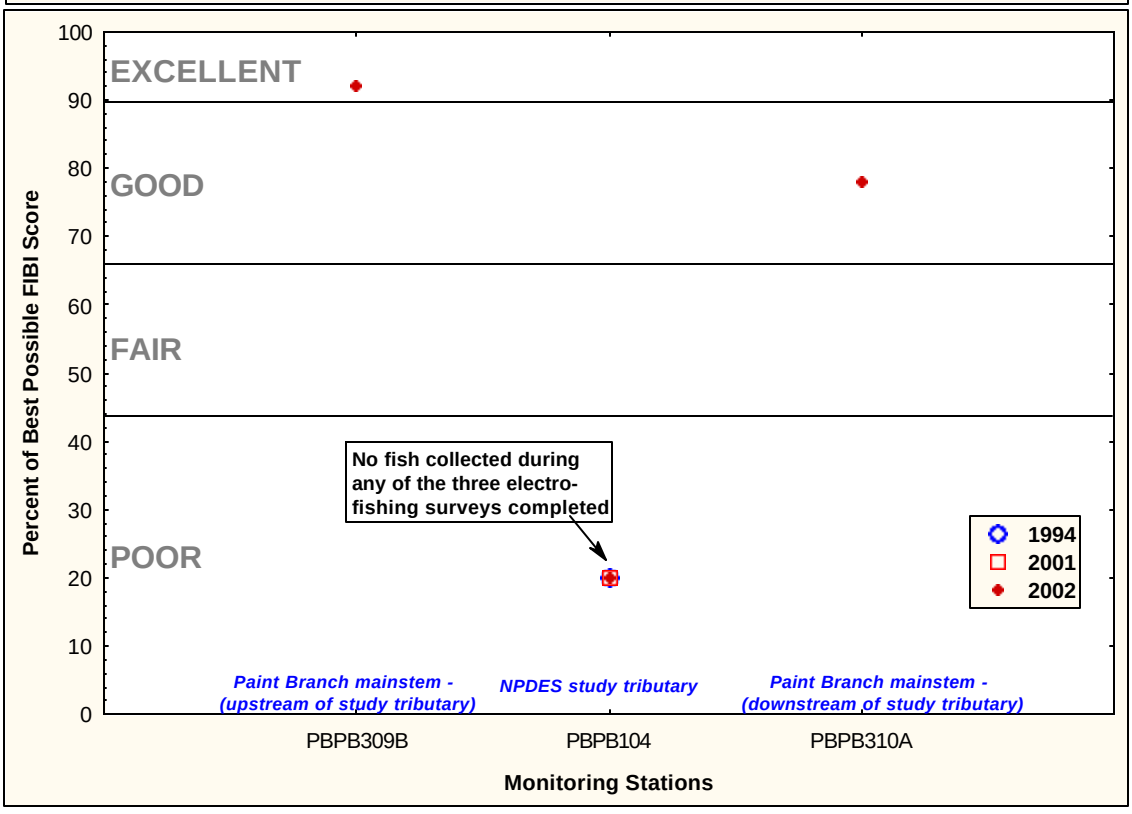
The FFG classifications are ecological classifications that distinguish benthic macroinvertebrates on the basis of how they process different food categories within stream systems (Camann, 2003 and Cummins in Loeb and Spacie, 1994). The five FFGs usually examined in a bioassessment are collector gatherers, filtering collectors, shredders, scrapers, and predators. Collectors are the most generalized and usually most abundant FFG because their food source of fine particulate organic matter is abundant. Shredders reduce coarse material (like leaves) into fine material which can then be transported downstream for use by collectors. Shredders actually use the fungi and bacteria present on leaf surfaces for food, breaking the leaf into smaller fragments in this process. Other FFGs include scrapers and predators. Scrapers scrape and graze on the diatoms and on other algae that grow attached on exposed surfaces. Predators attack and consume other insects and macroinvertebrates The dominant FFG's in first order headwater streams are typically shredders and collectors. The expected dominant FFG's in mid-reach streams are collectors and scrapers.

The FFGs in the study tributary are compared to those in Gum Springs in Figure III-D6. The Gum Springs station is in a first order stream also within the Paint Branch watershed but with significantly less contributing impervious area (less than 15% versus about 39% for the study tributary) and a BIBI score in the good range.

Collectors comprised almost 80 % and shredders only about nine percent of the benthic community in the study tributary. The shredders were all pollution tolerant craneflies (Tipulidae). Predators made up the rest of this community. In contrast, 40% of the Gum Springs community were collectors and almost 20% were classified as shredders. The shredders were represented by three genera: dominated by two very sensitive stonefly taxa (Amphinemura sp. and Leuctra sp.) and then craneflies as the third. Filtering collectors and scrapers made up almost 20% each of the Gum Springs community. The benthic community composition in the study tributary was thus unbalanced compared to that in the other first order tributary. Shredders were not as abundant and there were no scrapers or filtering collectors.

Figure III-D5. Benthic Index of Biological Integrity (BIBI) and Fish Index of Biological Integrity (FIBI) at Stewart-April Lane Tributary and Paint Branch Mainstem





In contast to the study tributary, the Paint Branch mainstem stations had greater diversity in FFGs as shown in Figure III-D6. The FFG composition at these stations were as expected for a mid-reach stream At this point within a typical stream system, type of food available would have shifted from that available upstream and attached algae would be more abundant. The collectors represented a larger proportion of the benthic community than in the first-order streams, presumably because of the abundant fine particulate organic material being transported from upstream sources. The proportion of scrapers also increased as expected from an increased availability in the amount of attached algae.

Taxa Richness and Subsample Size

The greater the number of different taxa found at a station, the greater the Taxa Richess. The average number of taxa found in the tributary during the three years of monitoring was much less than that at Gum Springs (nine vs 18 taxa). The tributary taxa richness was also less than for either mainstem station--20 taxa upstream and 19 downstream.

The collected sample is typically divided among grids for random subsample of all organisms collected. The number of grids necessary to collect 100 organisms provides information on the abundance of benthic macroinvertebrates at that station. The DEP protocol provides for a maximum of 20 grids. When all 20 grids must be screened to obtain the 100 organism subsample, then all benthic macroinvertebrates collected in that sample have been counted. Overall abundance of organisms would be very low in these cases.

In 1995, 20 grids were required for the study tributary subsample of only 53 individuals. In contrast, only one grid was required to obtain 154 individuals at the Gum Springs station. Seven grids were required to obtain 101 for the upstream mainstem station and three grids were required to obtain 157 seven individuals at the lower mainstem station. The abundance of benthic macroinvertebrates in the study tributary was very low.

Biotic Index and Pollution Tolerance

The biotic index measures the amount of organic pollution tolerant benthic macroinvertebrates in a subsample. The higher the index number, the more pollutant tolerant individuals are in the subsample. The maximum biotic index score is 10. Communities with scores less than 3.31 are considered to have few pollution tolerant individuals, between 3.31 and 6.66 to have moderate numbers of pollution tolerant taxa, and communities with scores greater than 6.66 to have a large percent of the community composed of pollution tolerant individuals.

In 2002, the study tributary had a biotic index score of 7.72 while the Gum Springs station had a biotic index score of 2.62. The higher biotic index score of the study tributary is indicative of a high amount of organic pollution tolerant taxa in this tributary. When considered with the very low number of organisms in the sample compared to other stations, organic pollution is indicated among the factors other than habitat that adversely affect the benthic macroinvertebrate community in this tributary.

Figure III-D6. Comparison by percent functional feeding groups in two first-order Paint Branch streams. ***Stewart April Lane Tributary: 39% impervious, benthic index of biological integrity poor . Gum Springs Tributary: less than 15% impervious, benthic index of biological integrity good.***

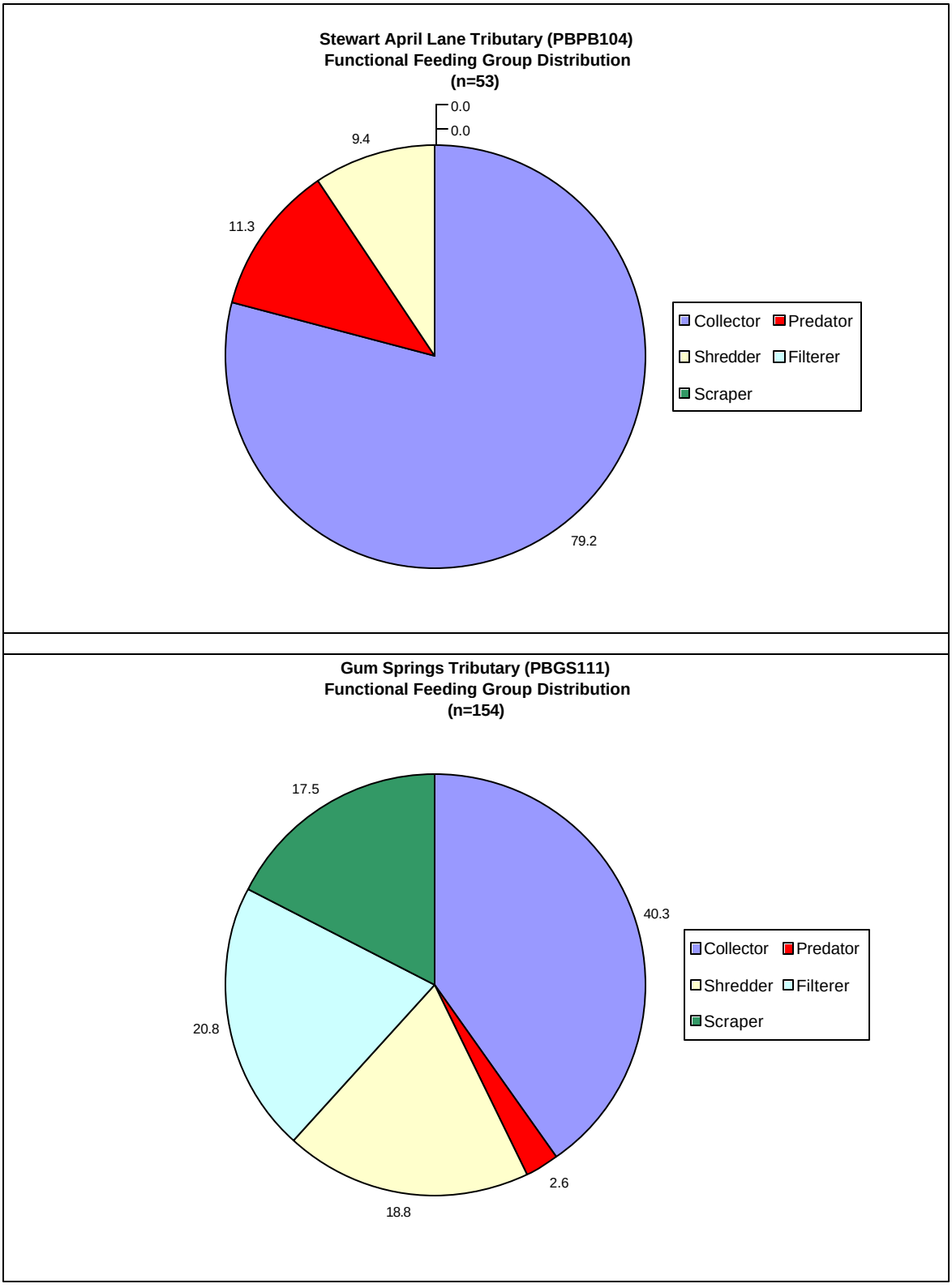
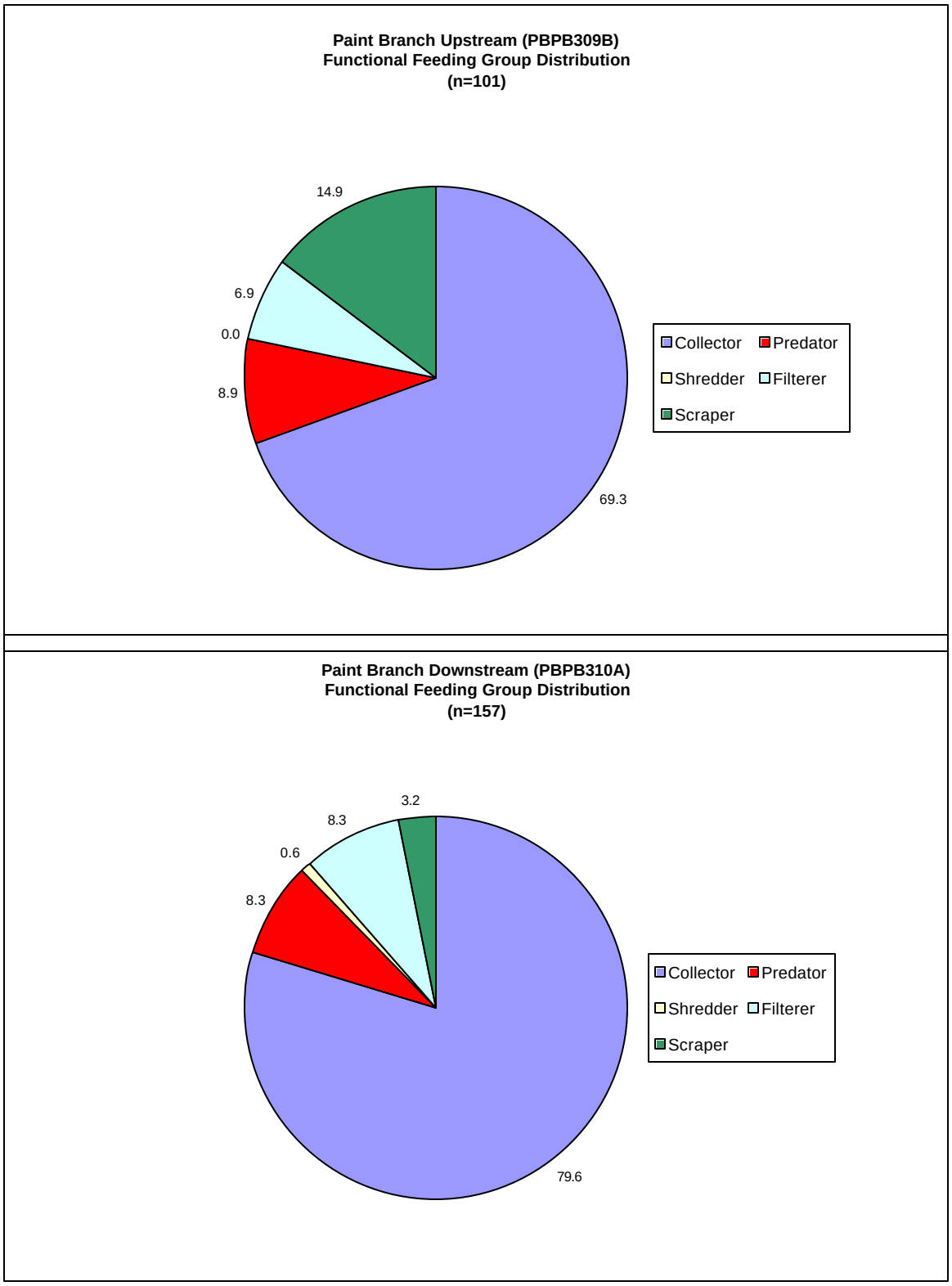


Figure III-D7. Comparison by percent functional feeding groups in mainstem Paint Branch upstream and downstream of the Stewart-April Lane Tributary.



Cooperative Effort with University of Maryland, Aquatic Ecology Laboratory

From 2000 to 2003, the University of Maryland (UMD), Aquatic Ecology Laboratory and the DEP conducted small watershed monitoring through a cooperative partnership. The goal of this project was to determine how the timing, rate, and spatial configuration of land conversion influences stream habitat and ecosystem health in four watersheds. The Paint Branch and Northwest Branch watersheds in Montgomery County, representing mainly older residential development, were to be compared to the Hawlings River watershed in Montgomery County and the Cattail Creek watershed in Howard County, representing rapidly expanding rural-suburban/urban fringe development. Sixty-five sites were identified in these four watersheds to represent subwatersheds that differed in the extent and pattern of development.

The study design included a geomorphology component with surveying cross-sections, sampling bank sediment, collecting bed sediment samples, measuring the slope of the streambeds, and assessing the condition of riparian vegetation. This work was conducted by the University of Delaware. For the ecology component, benthic macroinvertebrate, fish community, and nutrient dynamics were monitored. The UMD also conducted monitoring of nutrient dynamics (transport and uptake) in all four watersheds. Detailed habitat assessments were completed along with the nutrient studies to document channel morphology, sediment sizes and distribution across the channel, organic debris in the streams, and canopy cover. Preliminary results are anticipated later in the year 2003.

Although not included in the original study design, the Stewart April Lane Tributary and Paint Branch mainstem are now among the reaches being monitored for ecosystem response to stream restoration. During the spring of 2002, students in the UMD's Aquatic Ecology Class were grouped in pairs to study, measure and report on different aspects of the study tributary compared to the mainstem ecology, using the same field methods as the DEP. Their conclusions were consistent with those based on DEP data. The FFG indicators regarding percent community composition pointed to increased stressors affecting the study tributary compared to the mainstem. The biotic index assessment was also consistent with DEP's, although the study tributary was rated as more severely impaired. The tributary received a score of 9.8 (very poor) and the mainstem received a score of 6.7 (poor). Their 2002 tributary subsample contained only 44 individuals, consistent with the low total number found in the DEP subsample. The detailed results of their studies are available as presentation files at http://www.entmclasses.umd.edu/entm633/.

E. Management Programs

E1. Stormwater Management Program

Facility Inspections and Maintenance

The County continues its preventative maintenance inspections of stormwater management facilities on at least a triennial basis. Program performance measures, as submitted to the County's Office of Management and Budget, are shown in Table III-E1. During FY02, the DEP staff and contractors completed inspections at 197 ponds and other above-ground structures (triennial inspection required) and at 742 underground structures (annual inspection required). From these 939 total inspections, it was determined that some sort of repair was needed at 99% of the above-ground structures and 71% of the underground structures.

More details on maintenance inspections and results will be submitted to MDE when Annual Program Reports are developed. These Annual Reports will be useful in evaluating and predicting revenue needs when the County Council considers the annual rate for the Water Quality Protection Charge (WQPC). The WQPC, first levied during FY02, was created as a dedicated funding source for construction, operation, and maintenance of storm water management facilities and for related enforcement and administration. In its first year, the program focused on organization, establishing full staffing support, and outreach to homeowners' associations and the general public, as well as continuing required maintenance inspections and repairs.

Stormwater Management Ordinance and Implementation

The Permit-required information on stormwater management concept plans approved during the reporting year is shown in Table III-E2 and included in the database on the CD in Attachment A.. The number of sediment control permits remained about the same in both years, but there was a significant decrease in acres developed--from 2,125 to 1,390 acres. The acres developed with stormwater management compared to total developed acres increased significantly--from 1,256 of 2,125 acres in the year 2001 to 1,122 of 1,390 acres in the year 2002. In part, this reflects a reduction in number of projects exempt from stormwater management due to changes in State law (from 59 projects out of 886 permits issued in 2001 to 27 projects out of 890 permits issued in 2002).

The County continues to report the various types of stormwater management waivers which have been granted. However, the DPS questions the validity of doing so because of differences in local laws and ordinances statewide. What some jurisdictions consider a waiver of onsite stormwater management with a required payment of fees is considered by other jurisdictions as being onsite stormwater management through the payment of fees. The actual on-the-ground results may be exactly the same although the accounting may differ. It is therefore difficult to compare waivers reported among the jurisdictions. Additionally, the potential for waivers of local requirements that are more stringent than State regulations and the difference in the fee rates among the jurisdictions make direct comparisons of reported waiver statistics invalid.

Table III-E1.
Stormwater Facility Maintenance Inspections. Program Performance Measures.

ENVIRONMENTAL PROTECTION

PROGRAM:	**PROGRAM ELEMENT:**
Environmental Policy and Compliance	Stormwater Facility Maintenance Inspections

PROGRAM MISSION:
To ensure the safety of all publicly- and privately-owned stormwater management facilities, and to protect local streams as required by County, State, and Federal regulations

COMMUNITY OUTCOMES SUPPORTED:
- Protection of streams from stream bank erosion
- Protection of aquatic life from sediment and associated pollution
- Protection of public safety and restoration of vital infrastructure

PROGRAM MEASURES	FY00 ACTUAL	FY01 ACTUAL	FY02 ACTUAL	FY03 BUDGET	FY04 TARGETS @ MARC
Outcomes/Results:					
Percentage of stormwater facilities requiring repair[a]					
- Triennial inspections (ponds and other above ground structures)[b]	93	99	99	50	50
- Annual inspections (underground structures, water quality inlets, etc.)[c]	54	59	71	70	50
Service Quality:					
Percentage of mandated triennial inspections completed	74	100	100	100	100
Efficiency:[d]					
Cost per facility inspected					
- Triennial inspections	441	480	480	415	400
- Annual inspections	441	480	480	415	400
Workload/Outputs:					
Number of inspections completed					
- Triennial inspections	414	60	197	270	530
- Annual inspections	595	707	742	1,007	1,317
Total inspections	1,009	767	939	1,277	1,848
Inputs:[e]					
Expenditures - inspections ($000)	425	355	440	511	739
Expenditures - other program costs ($000)	20	13	11	20	0

Notes:

[a] The NPDES (National Pollutant Discharge Elimination System) permit specifies requirements for inspection and maintenance of stormwater management facilities throughout the County.

[b] The Federal Environmental Protection Agency and the Maryland Department of the Environment NPDES permit require triennial inspections of ponds and other above-ground stormwater facilities. The triennial cycle began again in FY02.

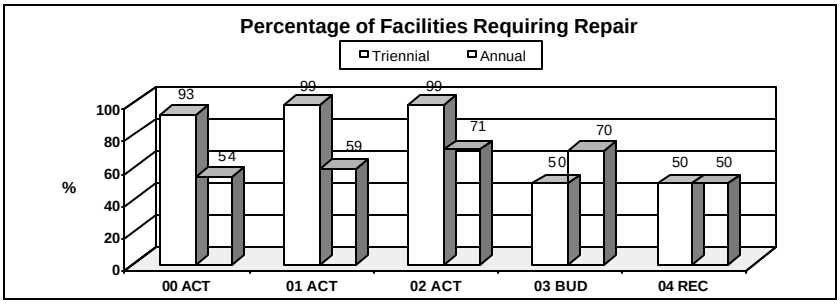
[c] Department of Environmental Protection policy and the County Code require annual inspections of underground structures, water quality inlets, etc.

[d] Prior to FY00, most inspections were conducted by County staff, whose costs were included in the corresponding efficiency measures. Since FY00, efficiency measures have included only contractual inspection costs.

[e] Expenditures for inspections include contractual costs only. The contracts are monitored by Department of Environmental Protection staff, whose costs are not shown here. Other program costs for FY04 are included in the Program Measures for the Water Quality Protection Charge.

EXPLANATION:

The inspection activities of the Stormwater Facility Maintenance Program were phased in beginning in FY98 and did not become fully operational until late FY99. For that reason, the percentage of compliant facilities was relatively low in FY99. Compliance has increased markedly since then and continues to grow. The number of stormwater facilities in compliance with County, State, and Federal regulations is expected to increase.



PROGRAM PARTNERS IN SUPPORT OF OUTCOMES: Department of Permitting Services, Department of Housing and Community Affairs, Office of the County Attorney, Maryland-National Capital Park and Planning Commission, home owner associations, commercial property owners.

MAJOR RELATED PLANS AND GUIDELINES: Countywide Stream Protection Strategy, Federal Clean Water Act, National Pollutant Discharge Elimination System Municipal Stormwater Permit, Chapter 19 of the Montgomery County Code.

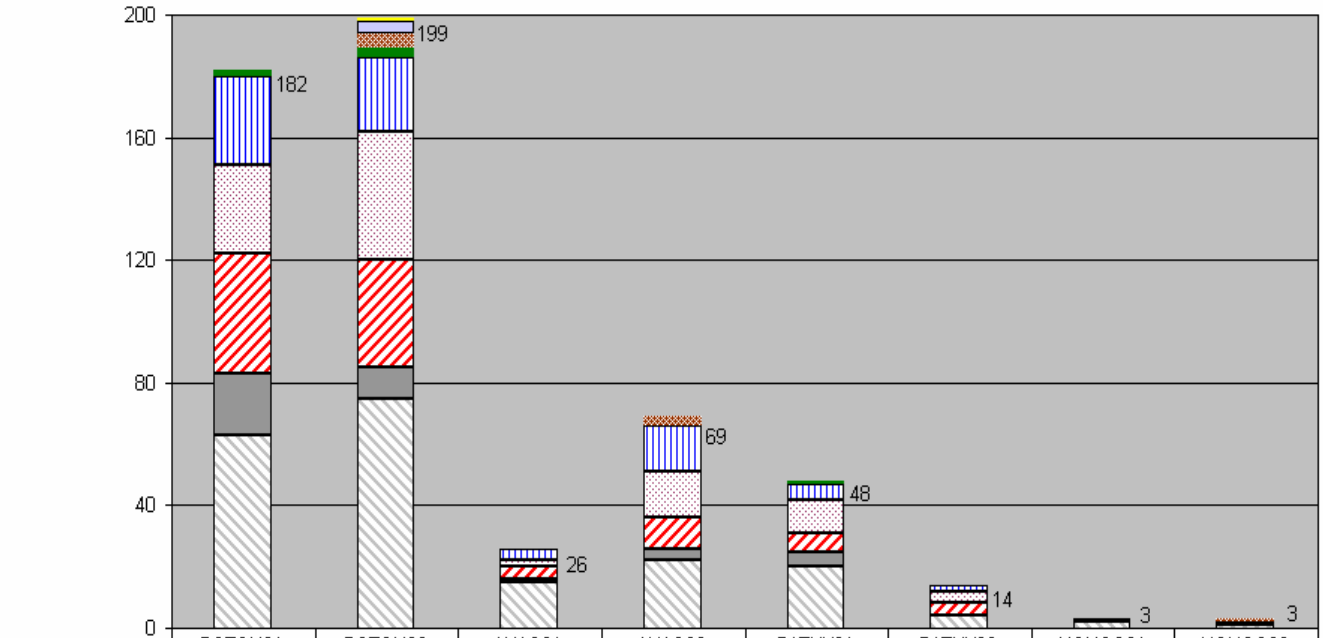
Table III-E2. Permit-required Stormwater Programmatic Information for Calendar Years 2001 and 2002.

PERMIT CONDITION	YEAR	
	2001	2002
Number of Sediment Control Permits Issued	886	890
Total Number of New Preliminary Plans Received, including those that are exempt or for which full or partial waivers were granted	231	190
Redevelopment Projects	35	26
Projects Exempt from Stormwater Management Requirements	59	27
Number of New Projects Which Received Full or Partial Waivers of Two-Year Stormwater Management Requirements	52	37
Number of New Projects Which Received Waivers of Channel Protection Volume Storage Requirements	0	5
Number of New Projects Which Received Waivers of Quality Management Requirements	31	40
Number of Redevelopment Projects Which Received Full or Partial Waivers of Two-Year Stormwater Management Requirements	23	8
Number of Redevelopment Projects Which Received Waivers of Channel Protection Volume Storage Requirements	0	7
Number of Redevelopment Projects Which Received Waivers of Water Quality Management Requirements	10	4
Waiver Fees Are Required Where Waivers Are Granted. They Are Collected at the Time Building Permits Are Requested	$1,183,587	$1,200,484
Acres Developed (Based on Issued Sediment Control Permits)	2,125	1,390
Acres Served by Stormwater Management Facilities (Based on Approved Stormwater Facilities which are included in issued Sediment Control Permits)	1,256	1,122

Figure III-E1 compares BMPs approved and implemented during 2002 by County major watershed. This information is included in the database on the CD in Attachment A. During 2002, the number of BMPs implemented increased in the Potomac and Anacostia, decreased significantly in the Patuxent (from 48 to 14), and stayed the same in the Monocacy. As in the year 2001, BMPs that work by filtration (FILTER) represented the majority of those approved. These individual structures may be part of a treatment train, where initial runoff treatment is through a sand filter which then discharges into a pond for additional treatment.

Figure III-E1. Best Management Practice (BMP) Implementation by County Major Watershed. Comparing the years 2001 and 2002. Total Number shown to right of each column.

Notes:



WATERSHED/YR:	POTOM01	POTOM02	ANAC01	ANAC02	PATUX01	PATUX02	MONOC01	MONOC02
OPEN _CH	0	1	0	0	0	0	0	0
POND	0	4	0	0	0	0	0	0
NONSTRUCT	0	5	0	3	0	0	0	1
WETLND	2	3	0	0	1	0	0	0
FLOWSPLITTER	29	24	4	15	5	2	0	0
CPV_FAC	29	42	2	15	11	4	0	1
OTHER	39	35	4	10	6	4	1	0
INFILT	20	10	1	4	5	0	0	0
FILTER	63	75	15	22	20	4	2	1

1. For This Report CPV Means either Two Year Stormwater Management or One Year Extended Detention depending on when the stormwater management concept was approved.
2. "Other" Facilities Typically Include Those Not Approved By MDE as Meeting Full Water Quality Requirements

E2. Water Quality Program Enforcement

Outfall Screening

During late fall 2002, the DEP screened a total of 111 outfalls with 16 having dry weather flows. The DEP continued to concentrate its monitoring efforts in older, urban areas of the county with a relatively large impervious drainage area and a history of environmental complaints. Errors in outfall location or type as shown on the existing maps were reported and corrected in the GIS inventory.

A higher than usual number of monitored outfalls had dry weather flows. One explanation for the increase in dry weather flows could be the unusually wet fall and winter months, along with the fact most of the monitoring took place in days following a greater than five-inch snowfall in December 2002 and the resulting melt. Of the 16 having dry weather flows, five showed detergent above detection limit, three showed chlorine above detection limit, and one showed phenol above detection limit. The numbers and types of findings are similar to those in the past. Source tracking was unsuccessful at these outfalls.

For the year 2003, the DEP will continue its focus on the older, urban areas, targeting outfalls that are located in the Phase 2 municipalities of the Towns of Chevy Chase, Kensington, Somerset, the Village of Friendship Heights, and Chevy Chase Village. This will be the second screening in these areas as the outfalls in these watersheds (Lower Rock Creek and Little Falls Branch) were included among those required for the countywide, random approach during the County's first NPDES MS4 permit period for the years 1996 through 2001.

The DEP will also begin targeted screening of 10 outfalls at various points along the Washington Metropolitan Area Transit Authority (WMATA) systems. The discharges to these outfalls in Montgomery County are groundwater from WMATA's tunnel dewatering activities, which should not result in surface water quality issues. The outfalls occur in the Lower Rock Creek, Sligo Creek, Northwest Branch, and Little Falls Branch watersheds and are either missing or not accurately located in the County's GIS inventory. Since any spills or improper discharges in the WMATA tunnel system would likely end up at one of these outfalls, proper mapping and unique identification is necessary. A one-time screening is planned, although further screenings will be added if necessary.

Water Quality Investigations during 2002

For calendar year 2002, the DEP Division of Environmental Policy and Compliance (DEPC) investigated 155 water quality complaints, 106 hazardous materials spills and discharges which resulted in 23 civil citations and 36 Notice of Violations (NOVs). Summarized in Table III-E3 are some of the more significant incidents which were investigated by DEPC.

TABLE III-E3. Examples of Water Quality Enforcement during 2002.

1. Town of Somerset. Discharge in Little Falls Branch at Somerset Park.

A reoccurring white discharge was reported coming from the outfall pipe located at Little Falls Branch and Wisconsin Avenue. The discharge was caused by core drilling in the WMATA subway tunnel. Combined enforcement action was undertaken by MDE and DEP. The discharge ceased soon thereafter.

2. Bethesda. Sewage discharge Little Falls Drive.

Investigation lead to a sewage backup on Jennifer Avenue in NW Washington DC. Significant coordination of cleanup efforts was required between DEP, WSSC, WASA, the Montgomery County DPW&T and the Hecht Company who as the property owner was required to clean an underground vault. Vault was cleaned and the sewer break repaired.

3. Silver Spring. Buried drums at Blackburn Road.

Investigation led to the discovery of several buried drums on waste oil on a site under development. DEP ordered remediation and it was completed in a timely manner.

4. Burtonsville. Sewage Leak at Valley Mill Park.

Acting upon a referral from the County Executive's Office, DEP investigated a report of sewage leaking into a storm water pond that discharges into the Paint Branch. The requestor stated that he had contacted several different agencies about the problem but the discharge persisted. Investigators from DEP were able to locate the discharge and had WSSC correct the problem the same day.

5. Takoma Park. Illegal discharge of Paint, Columbia Union College.

NOV issued for the discharge of paint by college student painters directly into the storm drain. Activity ceased immediately with no further incidents.

6. Germantown. Violations at 19430 Waters Road, (continued)

A search warrant was executed in June 2001 for the Martens property located at 19430 Waters Road Germantown. The warrant was for numerous environmental, housing and fire code violations with water quality a significant problem. The hearing was held on April 16, 2002 and fines of $44,300 were collected and a consent order for abatement was signed. Investigations are continuing and the owners have been issued NOV's for ongoing violations along with a contempt hearing before the judge.

7. Rockville. Illegal Dumping of Sediment/Sludge at the Gude Shell, Gude Drive.

An illegal dumping of car wash sediment/sludge into a storm drain was reported to DEP. The owner of the station and a contractor hired to clean the car wash pit and dispose of the material were issued civil citations by DEP and the case was referred to MDE Environmental Crimes Unit for further enforcement.

8. Rockville. Cooking grease discharges at the Shopping Center Shady Grove Rd and Crabbs Branch Way.

Several inspections were conducted at this location as part of an ongoing, proactive approach to prevent cooking grease discharges. Significant discharges of cooking grease were observed from the rear of the shopping center and into the storm water pond. A NOV was issued to the center's management. The grease was cleaned, the grease dumpsters repositioned, and further monitoring has revealed no further discharges.

9. Rockville. Diesel fuel spill. Seven Locks Road,

A commercial fuel supplier spilled over 600 gallons of diesel fuel on 12/31/02 at the County's Seven Locks Facility. The fuel contaminated the soil, and entered the storm drain, stream and storm water pond. Heavy rains occurred within 24 hours of the spill. The majority of the product was recovered from the stream. Containment booms remained in place for several weeks after the incident and a slight sheen was observed 2 weeks after the spill. Civil citations issued by DEP and soil probes ordered by MDE.

10. Rockville. Ongoing investigation of water quality violations on Dover Road.

A search Warrant was executed in August 2002 for environmental, health, housing and fire code violations at a Dover Road junk yard. Over 100 civil citations have been issued that include 17 for water quality violations. The court hearings are ongoing as of May 2003. Alleged violations include an illegal discharge of waste automobile fluids into a septic tank and overland into an adjoining property and eventually into a tributary of Rock Creek.

11. Lower Rock Creek, Montgomery County MD. Pesticide spill.

In November 2002, Pied Piper Pest Control in Silver Spring was sentenced for spilling pesticides in May 2000 that killed up to 150,000 fish in Maryland and the District of Columbia. The company was ordered to pay $15,000 to Montgomery County and $5,000 to the State to cover spill response costs, in addition to conditions on the company license and on the responsible employee.

Implementation Status of Stormwater Pollution Prevention Plans

Table III-E4 lists the County facilities covered under the State General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit). During 2002, the County was required to file a notice of intent (NOI) for these nine facilities to comply with the re-issued State General Permit ((Permit No. 02-SW). The State accepted the NOIs in March of 2003 for coverage until November 30, 2007. The County's point of contact for these NOIs is within the DPWT, not within the DEP, as was the case for the past two General Permits.

A comparison of last year's to this year's site assessments show similarity in type of items to be addressed. These include the need for greater attention to routine inspections and record-keeping, for elimination of outdoor vehicle washing as a non-stormwater discharge, and more widespread employee training to enhance pollution prevention awareness. These categories will continue to be of high importance and therefore will likely remain as needing improvement on assessments for the foreseeable future. The DPWT is working through the County's Pollution Prevention Program and the Office of Human Resources (OHR) Employee Development Program to develop and institute more routine opportunities for staff training on environmental awareness and work site responsibility.

Due to budget constraints, property limitations, and the existence of CIP plans for facility renovations, it was determined that immediate construction of vehicle wash facilities would not be the best long-term solution. It is true that the lack of indoor vehicle wash facilities at three sites will prevent the complete elimination of washwater to the storm drain system. However, each facility will continue to manage outdoor vehicle washing in order to eliminate the potential for contamination and the direct runoff of washwater to the storm drain system.

During 2002, funds were made available to address repairs of existing vehicle wash facilities. Current CIP program projections point to no sooner than the year 2008 for realizing funding for facility renovations that would include indoor vehicle wash facilities.

TABLE III-E4. Results of Annual Site Assessments at Montgomery County Facilities Under the General Permit for Stormwater Discharges (Permit No. 02--SW).		
FACILITY	**SUMMARY 2002**	**ASSESSMENT 2003**
Colesville Highway Maintenance Depot Anacostia-Paint Branch; 12 acres	In very good condition with good recordkeeping; need for attention to materials and drum storage	1. *Maintains good condition.* 2. *Need to eliminate any outside vehicle washing because of additional permit required.* 3. *Need for routine sweeping of outside areas to reduce grit and other solids that could get into storm water best management practices (BMPs).* 4. *Last training occurred in October 2001; two staff participated.*
Damascus Highway Maintenance Depot Potomac-Great Seneca Creek; 1.4 acres	Need to include public "drop-off" area in routine inspections; outdoor vehicle washing is occurring without runoff control	1. *Public "drop-off" area not yet added to routine inspections. Needs to be swept frequently to minimize blowing trash and monitored frequently for potential spills or leaking material.* 2. *No provisions for indoor vehicle washing at site. Outdoor vehicle washing requires permit.* 3. *Last training occurred in October 2001; two staff participated.*
Gaithersburg Highway Maintenance Depots, Equipment Maintenance Operations Center & Gaithersburg/Rockville Transit Services Potomac-Rock Creek; 26 acres	Need for more detail on routine inspections and houskeeping; outdoor vehicle washing is occurring despite indoor vehicle wash facility on-site	1. *Significant contractor fuel spill in December 2002 was addressed rapidly and effectively.* 2. *Need to cover all outside storage areas and remove potential contaminating products as soon as possible.* 3. *Need to maintain routine trash removal, area cleaning, and sweeping of paved areas.* 4.*Pollution Prevention and Environmental Management training presented in March 2002. About 60 staff attended.*
Poolesville Highway Maintenance Depot Potomac-Dry Seneca Creek; 4 acres	Need for more routine inspections and attention to housekeeping; outdoor vehicle washing is occurring without runoff control	1. *Greater care needed for routine inspections and housekeeping at public disposal areas.* 2. *Need to provide routine maintenance of on-site BMPs--sand filter clogged and non-functioning at time of inspection.* 3. *Need for routine sweeping of paved areas to reduce materials getting into storm water BMPs.* 4. *Recommend that fuel site be inspected daily.* 5. *If outdoor vehicle washing is to continue, then discharge permit required.* 6. *Last training occurred in October 2001; two staff participated.*
Seven Locks Maintenance Center Potomac-Cabin John Creek; 19 acres	Need for more routine inspections and housekeeping; outdoor truck washing is occurring	1. *Site in generally good condition. Need to continue routine inspections and housekeeping.* 2. *If outdoor vehicle washing is to continue, discharge permit required.* 3. *Last training occurred in October 2001; six staff participated.*

TABLE III-E4. Results of Annual Site Assessments at Montgomery County Facilities Under the General Permit for Stormwater Discharges (Permit No. 02--SW).		
FACILITY	**SUMMARY 2002**	**ASSESSMENT 2003**
Silver Spring/ Brookville Road Service Park Potomac-Rock Creek; 18 acres	Need for more routine inspections and site housekeeping; vacuum truck dewatering area needed; missing curbing behind scrap metal dumpster; outdoor truck wash needs repair; oil storage tank needs repair	1. *Vacuum truck dewatering area still needed.* 2. *Need to develop solution to continual spills outside of mixing for road application from salt storage domes.* 3. *Need for more routine inspections and housekeeping* 4. *Pollution Prevention and Environmental Management training in March 2002. About 40 staff attended.*
Solid Waste Transfer Station/Materials Recycling Facility Potomac-Rock Creek; 43 out of 52.5 acres	Extensive inspections and recordkeeping logs; minor housekeeping items to be addressed; water quality violation from adjacent commercial property was identified during annual site assesssment	1. *Outfall specific as well as area assessment provided.* 2.*General comment to continue with current routine cleaning and maintenance of inlets, storm drains, and general housekeeping.* 3. *Hazardous Materials Storage Area. Roof installation ongoing. Products are being stored in cabinets until completion.* *4. Two County site managers received pollution prevention training June 14, 2002. Operations contractors at the Transfer Station, Covanta Energy and Maryland Environmental Service, have their own environmental and safety training program.*
Gude Landfill (closed 1982) Potomac-Rock Creek; 120 acres	Minor erosion to be addressed	1. *Outfall specific as well as area assessment provided.* 2. *Need for some trash removal.* 3. *Need for leachate seep repairs noted during March and completed by April 2003.* *4. One contractor, Covanta Energy, and two site employees attended pollution prevention training on June 14, 2002. The contractor also has its own environmental compliance manager that routinely visits the site and conducts a training program.*
Oaks Landfill Patuxent-Hawlings River and Potomac-Rock Creek; 190 out of 545 total acres	Extensive inspections and recordkeeping; minor erosion problems	1. *Outfall specific as well as area assessment provided.* 2. *Culvert and leachate loading repair needs noted in March and completed in April 2003* 3. *Used oil stored on-site was removed for recycling. Noted small leaks from equipment and added additional spill absorbent material at site.* *4. Two County site managers and two contractor staff received pollution prevention training on June 14, 2002. The leachate treatment plant contractor, Weston Solutions, Inc., also receives company safety and environmental protection training.*

E3. Illegal Dumping and Spills

The DEP continues to support its Illegal Dumping Hotline at 240-777-3867 ("DUMP"). During the year 2002, there were 571 complaints of illegal dumping, the vast majority of which concerned bags of trash, vegetation (leaves or brush), or other unwanted materials either dumped or being stored on private property. Only about 1 percent of these cases represented a potential for direct runoff of contaminated material into a storm drain or receiving stream. Complaint resolution invariably involved removal and proper disposal of trash and debris and proper storage (i.e. under cover) of other materials.

The DEP has updated its Emergency Response Guide for handling accidental spills or intentional discharges to reflect appropriate contact agencies and telephone numbers. This is included in electronic format on CD in Attachment A.

E4. Sediment and Erosion Control

Implementing Program Improvements

As a follow-up to the prior work of the County's Sediment Control Task Force, the DEP conducted a field review of the ongoing DPS sediment and erosion control program intended as a supplement to the regular triennial program review conducted by the MDE. The resulting report was published in January 2002 and is included in electronic format on CD in Attachment A.

The DEP's review was designed to determine:

- What percent of evaluated sites appeared to be under effective sediment control;
- Whether the DPS issuance of an NOV followed by a Stop Work Order after 48 hours (SWO/48 hr) was effective in increasing the number of effectively self-maintained sites and;
- If sediment impacts were observed downstream of selected sites.

Findings

- Of the 122 active file sites, the majority had effective sediment and erosion control devices maintained and in place that controlled 90 to 100% of the actively disturbed area. Where maintenance expectations were defined, and cooperation and clear communication existed between site developers, site owners, and County staff, sites were usually properly maintained. The SWO/48 hr policy did not seem to decrease the number of NOVs issued relative to the number of inspections made. It did reduce the number of serious maintenance violations that required more than 48 hours to correct. The DEP recommended that the DPS revise their enforcement policy to reflect the MDE General Permit for Construction Site requirement that site managers maintain inspection records and self-maintain their sites.

  Subsequently, the DPS Sediment Control Inspection Section has encouraged construction site managers to complete weekly self-inspections and maintenance reports. This requirement is discussed at the pre-construction meeting. Additionally, if sites are found to have continued

maintenance violations, the MDE inspection staff could be notified and the site managers could be cited for violations of the federal Clean Water Act.

- Out of 16 sites surveyed, the DEP found four sites that had minor off-site sediment deposition and one site with serious sediment deposition . The DEP recommended that DPS develop an emergency response plan to effectively remove and remediate future sediment spills since delays in enforcement and sediment removal can greatly worsen the impacts that sediment has on stream systems.

  During 2002, the DPS and DEP began working cooperatively to develop an emergency response plan for sediment spills. The plan is in draft form and is expected to be completed during 2003.

- Other recommendations included the need for DPS staff: training and requirement to use routinely available electronic data, including the County's GIS coverages; routine review of relevant laws, regulations, and practices to assure consistent countywide application; improved recordkeeping to move sites from the "active" file to "close out" file as needed in a more timely fashion; and to improve site managers implementation of self-maintenance practices.

  During 2002, inspection staff attended a variety of classes at the Maryland Transportation Technology Center, covering asic Drainage, Construction Math, and Construction Inspection. Classes attended at the Maryland State Highway Administration included Nuclear Safety Training, Soils and Aggregate Compaction and Concrete Field Testing. Several staff attended classes at Montgomery College in Microsoft Office applications, including Excel, PowerPoint, and Word to update expand their proficiency in Information Technology.

  There has also been improved emphasis on recordkeeping to move sites from active status to closed-out status. Each inspector maintains a list of permitted sites he or she is responsible for. The DPS has acted aggressively to close many of the older inactive files that had been noted in the DEP evaluation.

Responsible Personnel Certification

During 2002, the DPS conducted eight sessions for Responsible Personnel Certification ("green card" certification) for sediment and erosion control. Required information on the 84 attendees is included on CD in Attachment A.

Grading Permits for Projects Greater Than One Acre

During 2002, the DPS began submitting the required quarterly reports as EXCEL spreadsheets via e-mail to MDE. The results for the year 2002 are included on CD in Attachment A.

E5. Public Education and Outreach

Watershed Outreach

The DEP's Watershed Management Division (WMD) continues a vigorous outreach program to increase citizen stewardship to protect watershed resources. This includes:

- Providing technical assistance and presentations to watershed-based community groups including the Friends of Cabin John Creek Watershed, the Friends of Sligo Creek, and Temple Shalom Watershed Group of Rock Creek.
- Featuring watershed-based community or homeowner/civic association on the DEP website, including non-governmental groups such as Anacostia Watershed Restoration Committee, Audubon Naturalist Society, Izaak Walton League of America, the Potomac Conservancy, Boy Scouts of Muddy Branch, and Sidwell Friends High School (Muddy Branch).
- Maintaining an extensive calendar of activities on the DEP web site and providing guidance to interested residents and community groups for the most appropriate involvement opportunities.
- Publicizing Montgomery County initiatives such as Community Service Month in October, when trash cleanups and tree plantings are numerous throughout the county and thousands of residents and volunteers perform hands-on watershed activities.
- Training high school students for the Annual Envirothon Competition, an effort led by the Montgomery Soil Conservation District. The WMD works with M-NCPPC to train students for the Aquatics Section.

The DEP routinely works in partnership with other agencies to suppport the regional protection efforts in both the Anacostia and Patuxent Reservoirs Watersheds.

- Together with the Surfriders Foundation, Prince George's County, Washington, D.C., the Metropolitan Washington Council of Governments, the DEP purchased new "do-not-dump" decals which are being glued on (not painted on) to storm drains throughout the Anacostia River Watershed.
- The WMD participates in the multi-jurisdictional Anacostia Watershed Trash Reduction Workgroup, led by MDE, to identify public education opportunities and maximize coordination to reduce trash entering the Anacostia River and its tributaries.
- The WMD helped to organize and conduct the April 2002 "Earth Month" of Patuxent Reservoirs watershed stewardship activities. There were 12 different events with over 300 participants, including watershed clean-ups, State Park trail maintenance, tree planting, and environmental outreach workshops and seminars. The DEP web site linked to the calendar of activities at the Washington Suburban Sanitary Commission web site.

Rainscapes Program

During 2002, the DEP was a partner with the Potomac Conservancy in developing the Rainscapes Program for residents and their backyards. Partially funded by the Chesapeake Bay Trust (CBT), the Rainscapes Program emphasizes how to "Make Your Backyard A Sponge" that absorbs and infiltrates rainwater rather than directing it uncontrolled into the storm drain system.

Three workshops were held during the spring, with demonstration rain gardens at each location. At the Montgomery County Public Schools Smith Center, both a rain garden and dripline planter were constructed.

- April 9, 2002 Poolesville High School Global Ecology Project – 32 residents
- April 24, 2002 Lathrop Smith Environmental Education Center, Rockville – 34 teachers
- May 15, 2002 Audubon Naturalist Society – Woodend, Chevy Chase – 31 residents

The effort included the development of a series of factsheets, now featured on the web at *www.rainscapes.org*. The factsheets provide background on the rain garden concept, links to sites with related information, a homeowner's lawn and landscaping survey, and a list of nurseries which sell native plants to the general public. The pilot program proved so successful that the DEP applied for and received funding from the CBT Urban Watershed Restoration Program to expand the Rainscapes Program during 2003-2004. Results will be included in next year's Annual Report.

Volunteers at the Audubon Naturalist Society Rain Garden Project
photo: Robert Burk, Potomac Conservancy

Watershed Restoration Projects

The WMD recognizes that public support is crucial to the successful implementation of selected projects and routinely holds public meetings for ongoing studies and proposed projects. The project managers even organized Saturday Stream Walks at certain projects to allow the public to see first-hand the extent of existing problems and possible remediation. During 2002, all except the Hawlings River Watershed Restoration Study (for a tributary to the Patuxent River) occurred in the Potomac River watershed.

- *Public Meetings for Watershed Restoration Opportunities*
  - ✓ Coqueline Run and Dunlop SWM Pond Projects (3/07/02), 50 people
  - ✓ Watts Branch Watershed Study (6/20/02), 30 people
  - ✓ Hawlings River Watershed Restoration Study (6/27/02), 15 people
  - ✓ Stoney Creek SWM Pond (8/15/02), 15 people
  - ✓ Stoney Creek SWM Pond (NIH Citizen Liaison Committee) (9/19/02), 40 people
  - ✓ Lower Paint Branch Watershed Study (11/14/02), 25 people

- *Saturday Stream Walks for ongoing watershed restoration projects in Rock Creek*
  - ✓ Coquelin Run and Dunlop SWM Pond Projects (4/13/02), 20 people
  - ✓ Upper Rock Creek Stream Valley Drive (6/08/02), 10 people
  - ✓ Stoney Creek SWM Pond (11/23/02), 10 people

Water Quality Advisory Group

The Water Quality Advisory Group (WQAG) was created in 1995 through the Water Quality Discharge Law to meet the NPDES permit requirement for authority to enforce against illicit discharges to the County's storm drain system. The 15 voting members represent the academic and scientific, agricultural, business, environmental, and public-at-large community. There are 3 ex-officio representatives, one each from the DEP, the M-NCPPC, and the WSSC. The WQAG meets monthly to discuss and provide recommendations on water quality issues affecting the County. These have included drought, groundwater, forest conservation, erosion and sediment control and stormwater, pollution prevention, West Nile virus, Chesapeake Bay Tributaries Strategies, and wastewater treatment. The WQAG has strongly supported the stream restoration work being conducted by DEP and M-NCPPC and the active participation by the public agency members who bring first-hand experience with these issues to the meetings. Specific actions during 2002 included:

- Proposed resolution on Education and Compliance Assistance to Business Owners for focused outreach and education efforts to help business owners improve their knowledge of and compliance with relevant environmental statutes.
- Proclamation of support for declaring 2002 as The Year of Clean Water and October as Clean Water Month.
- Letter of Appreciation on Montgomery County's Drought Efforts.
- Letter to the Executive regarding preventative measures to limit the use of motorized off road vehicles (MORVs) in County Special Protection Areas for water quality protection.

Outreach to the Business Community

Environmental Partners Program

The DEP is continuing outreach to the business community through the Environmental Partners Program. This program began in June, 2001 to include all environmental disciplines – air, water, hazardous materials, waste disposal, waste minimization and recycling. On July 23rd, 2002, County Executive Duncan presented the first annual Environmental Partners Program awards at Fletcher's Amoco in Olney to acknowledge the 22 charter members.

Environmental Partners Program Awards Ceremony. At podium: DEP director, Jim Caldwell: County Executive Duncan: and DEP program manager, Steve Martin.

The Program originally focused on automotive maintenance and repair shops. During 2002, it was expanded to include automobile body repair shops and has grown to 28 Partners. The Program has been recognized as an "Honorable Mention" under the Customer Service Category for the 2002 Montgomery's Best Honor Awards Program.

The DEP conducts a comprehensive on-site inspection to educate business owners and managers right at their own location about pollution prevention and how they can save money using environmentally friendly products and methods. Businesses that qualify as Environmental Partners go beyond meeting minimum regulatory standards, which means they have all applicable permits and comply with all Federal, State and Local laws. Additionally each business must agree to adopt (if they have not already done so) at least one environmental alternative in air quality, water quality, product substitution, and solid waste disposal. Affected outfalls are monitored and reductions in air emissions, water discharges and hazardous waste are tracked as well. Qualified businesses receive free advertising both in print and on the DEP web site, and receive a plaque of recognition to display at their site.

The Environmental Partners program has already proven to have a broad-reaching positive effect across environmental media, not only in Montgomery County, but throughout the Mid-Atlantic region. Merchant's Tire and Auto Centers, which operates 110 retail automotive service locations throughout the Mid-Atlantic, are making the switch from petroleum-based solvent parts cleaning units to new aqueous parts cleaning units. This translates into the elimination of 36.3 tons of smog-forming volatile organic compounds (VOCs) from our atmosphere per year and elimination of potential for spills of toxic solvents. Merchant's Tire will experience substantial dollar savings annually by making this switch while furthering their continuing commitment to protect the environment.

County's Pollution Prevention Program

Monthly meetings continued during 2002 to provide training and awareness on topics of interest to key county staff, particularly those in the DPWT involved in implementing the Stormwater Pollution Prevention Plans at the County-owned industrial facilities. The meetings featured the pollution prevention accomplishments at these facilities and the types of management being implemented. The identified need to broaden awareness is leading to the development of training modules that all new employees will be required to take through the OHR.

Environmental Management Systems

Three County departments (DPWT, Fire and Rescue, and DEP) have continued their commitment to implement environmental management systems (EMS) that were begun during the year 2000:

- The DPWT has completed a draft of their EMS Manual and is in the process of revisiting their objectives and targets so that their goals are achievable.
- The Department of Fire and Rescue Service (F&R) has had some changes in the EMS team due to staff retirements. The new members are being brought up to speed and are currently updating their EMS Manual.
- The DEP continues to make progress in achieving its EMS management plans to achieve its objectives and targets. In addition to the construction contractor and operational changes mentioned in last year's Annual Report, the DEP has made office supply purchasing policy changes to increase the purchase of "green" products and process changes to minimize paper generation and reduce waste.

Cross-Media Source Reductions

The DEP continues to lead among County agencies in reducing or eliminating sources of pollution from County operations and practices. For example, the DEP's presentation of the connection between improved air quality and reduction in fossil fuel energy use was instrumental in the County Council's passage of a resolution to purchase 5% of the County's total energy needs from wind-generation. Unfortunately, the funding required for this program was not placed in the current fiscal year budget due to anticipated significant revenue reductions.

The DEP has been successful, however, in getting this measure included in the interjurisdictional Resolution to be considered as part of the Region's strategy to meet Federal Air Quality Program requirements. The County would need to begin purchasing the 5% wind-generated energy by the 2006 ozone season, if one or more of the control measures fail or if this area is still in noncompliance with the air quality standard. The exact mechanism within the State's Implementation Plan (SIP) remains to be developed.

The calculated offset from wind-generated energy from the West Virginia Backbone Mountain Project is 0.114 tons per day of nitrous oxide (NOx) compounds for the Montgomery County purchase alone. These NOx air quality reductions would also result in reductions of nitrogen compounds reaching aquatic systems and in meeting the Chesapeake 2000 Agreement nutrient reductions. In *The State of the Chesapeake Bay* (EPA, July 2002), model estimates for the year 2000 attributed about 32% of the total nitrogen load to the Bay as coming from atmospheric deposition.

E6. Road Maintenance and Pollution Prevention

Storm Drain Cleaning

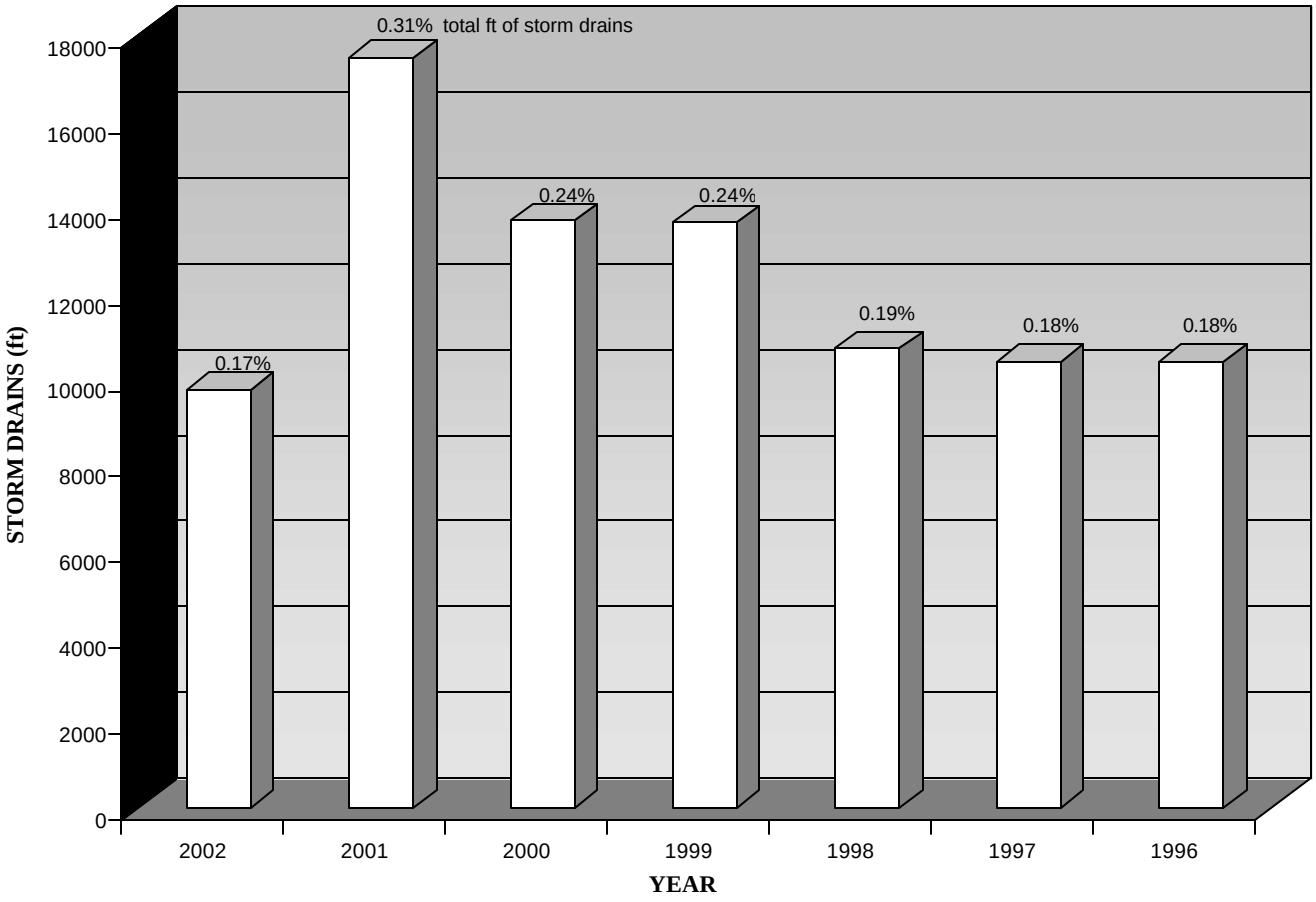
During 2002, the DPWT-DHS removed accumulated material from a total of 9,750 feet of storm drains, representing about 0.17% of total feet of County storm drains. As shown in Figure III-E2., this was the lowest amount of storm drain cleaning reported since Permit-required program tracking began in 1996. The reduction compared to 2001 also represented a significant departure from the previously increasing trend. The countywide program is complaint driven, i.e. crews are sent out in response to reports of clogged inlets or storm drains which are causing drainage problems on public or private property, so these reductions may reflect a decrease in number of complaints received.

The current storm drain maintenance program is funded at about $2.5 million per year from an ad valorem tax. The most recent study (CH2M Hill, 2001) on the status of the storm drain system estimated that about $12 million per year could be required for total system rehabilitation and/or replacement over an assumed 75-year service life.

Street Sweeping

In June 2002 (FY02), the DPWT-HWS swept 182.74 curb miles under the Arterial program, a one-time sweeping. This was a significant reduction from the year 2001, when a total of 4,611 curb miles had been swept and 2,780 tons of material had been prevented from entering the County's storm drain systems, stormwater management facilities, and streams. There was no residential or Piney Branch Central Business District sweeping during FY02 due to budget constraints. Program expenditures in FY02 was $11, 695 while the FY01 expenditure had been $292,000. The reduction in part reflected the very mild winter of 2001-2002 and consequent reduced road de-icing activities, but also a reduction in anticipated revenues and the need to reduce expenditures across the County.

Figure III-E2. Total Linear Feet of Storm Drains Cleaned from 1996 through 2002.



E7. Integrated Pest Management

Montgomery County is required to examine the use, control, and reduction of herbicide, pesticide, and fertilizer for all of its departments. During 2002, the County continued to implement its Integrated Pest Management (IPM) program at county-owned facilities. Dursban (chlorpyrifos) use was eliminated. In the year 2000, the USEPA required that the use of this pesticide be phased out in any areas where children could be exposed because continued exposure had been shown to cause adverse neurological effects.

Fertilizers were not applied at any County Facilities during calendar year 2002. Budgetary constraints directly affecting the DFS landscape program were the primary reason for this. Since funding for landscape activities for the FY04 budget year is at the same level as FY03, fertilizer use will continue to be curtailed. A comparison of usage between years 2001 and 2002 is shown in Table III-E5.

Table III-E5. Comparison of Pesticide and Fertilizer Use at County-owned Facilities for the calendar years 2002 and 2001.

Year 2002

Used for Landscape Purposes

The DFS Landscape IPM program includes 190 acres at 88 facilities.

Roundup 10 gallons (undiluted)
No fertilizers were applied during the 2002 Calendar year.

Used for Structural Pest Control Purposes

The DFS Structural IPM program includes 1,175,000 square feet at 73 facilities.

Maxforce gel	5.43 (lb)
Boric Acid	39.37 (lb)
Roach glue boards	1,2931 ea.
Maxforce roach baits	530 ea.
Drax ant gel	5.06 (lb)
*Wasp spray (5 cans)	7.5 Lbs.
*Delta Gard (granuals)	160 Lbs.
*Talon- G (rodent bait)	11.25 (lb)

Please note that since the last report, Dursban is no longer applied anywhere.

Note * applied only on exterior of structure (outside of the building)

Year 2001

Used for landscape purposes

The DFS landscape IPM program includes 170 acres at 77 facilities.

Roundup 4 gallons (undiluted)
Encore 5 gallons (undiluted)

Used for structural pest control purposes

The DFS Structural IPM program includes 930,000 square feet at 63 facilities.

Maxforce gel	55 grams
Boric-Acid	15 pounds
Roach glue board	2,145 ea.
Maxforce roach baits	2,448 ea.
Drax ant gel	180 grams
*Wasp spray (20 cans)	10 pounds
*Dursban granuals	100 pounds
*Tempo E/C	208 grams
*Talon bait	100 ounces

Note * used only on exterior of structure (outside of the building)

Pesticide Use Regulations

During 2002, the County began a program with a focus on protecting public health but which will also hopefully reduce pesticide use. The County Council amended County Code Chapter 33B Pesticides with Sections 33B-5 and 33B-6 through Bill No. 26-00, effective March 27, 2001. These new sections require retail sellers of pesticides within the County to handle, transport, display, and store pesticides separate from food, medicine, or pet food. The vender is also required to provide consumers with information on the proper handling and disposal of pesticides and on alternatives to chemical pesticide use. The Department of Health and Human Services will perform inspections at those businesses that are licensed to sell food. The DEP will inspect vendors not licensed to sell food ,but which may sell medicine or pet food, for the presence of spills, public education material, and proper separation of products on shelves. Under County Code Chapter 33b, the County may issue NOVs and levy fines to enforce these sections.

F. Watershed Restoration

The County is continuing its systematic assessment of water quality, stream resource conditions, and habitat modification within all of its watersheds. Since 1996, the County has identified restoration opportunities in about 40% of its total acreage During 2002, the Watts Branch Watershed Restoration Study began, the last of those required in the previous five-year Permit. Ongoing study and project implementation are shown in Figure III-F1.

Table III-F1 summarizes the status of the DEP's significant watershed restoration efforts through 2002. Stormwater management was added at one site for existing development in Paint Branch and three stream restoration projects (two in Northwest Branch and one in Paint Branch) were completed during 2002. Total cost to date (including State and Federal cost-share funding) for watershed restoration efforts completed or underway has been $22.34 million dollars. Of this, about $0.5 million of funding has been allocated for new projects to get underway

As part of its commitments to the Anacostia Watershed Restoration Agreement, the DEP is currently partnering with Prince George's County Department of Environmental Resources and University of Maryland on a low impact development (LID) pilot project sponsored by the EPA. The $1 million grant is funding the design and construction of a series of bioretention cells within the Anacostia River Watershed. Within Montgomery County, four publicly owned facilities have been selected as demonstration sites. These demonstration sites will play a vital role in documenting the construction feasibility, runoff treatment, and maintenance requirements of these innovative systems, which to date have been rarely used in Montgomery County.

Montgomery County will use $280,462 in EPA funding, plus contribute $125,000 of cash match towards the design and construction of these demonstration sites. The bioretention cells will capture and treat runoff from rooftops, parking lots, and other impervious surfaces for small contributing drainage areas. The University of Maryland will monitor runoff treatment at two of these bioretention projects, one each in Montgomery and Prince George's Counties. Monitoring results will be summarized in a future Annual Report.

Figure III-F1. Status of Montgomery County Watershed Projects for the Year 2002.

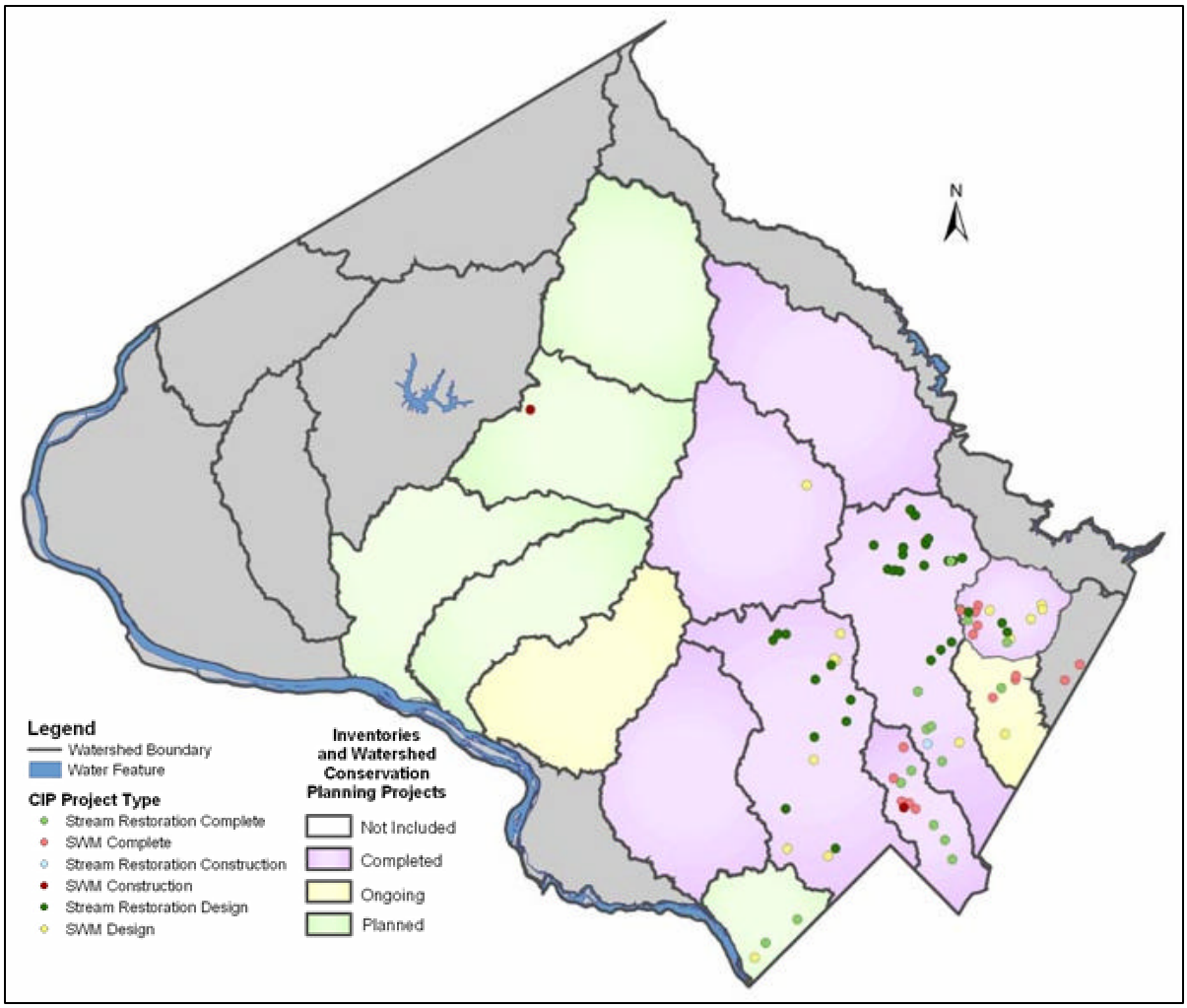


TABLE III-F1 . Montgomery County Watershed Restoration Studies and Projects. *(1996-2002).* ******* *Estimated costs for those projects still under design.*

Project Type	Completed	Underway or In design	Cost * ($m)
Watershed Study	Upper Paint Branch; Northwest Branch; Rock Creek; (191.5 sq. miles)	Cabin John Creek; Hawlings River; Lower Paint Branch (122.3 sq. miles)	3.131
Stormwater Retrofit	659 acres (9 projects)	3,407 acres (19 projects)	8.017
Stream Restoration	7.25 miles (12 projects)	21.9 miles (39 projects)	11.192

F1. Watershed Screening

Nutrient Monitoring

In 2001, the MBSS published results for its monitoring program in Montgomery County from 1994 through 1997. These results included nitrate-nitrogen (NO3--the principal component of the N in plant fertilizers) in its statewide program. Based on 1994-1997 sampling, the MBSS reported an average of 2.38 mg/l NO3 in the county, which gave it a ranking of 11th from low to high among the 23 jurisdictions in the state (Maryland Departmen of Natural Resources, 2001).

The DEP had conducted nutrient sampling at a select subset of stations during the spring of 1998 and 1999. Results for the 1998 synoptic nutrient survey (MDDEP, 1999) were submitted in the Annual Report for 1998 . These samples represent baseflow conditions, but as shown in Figure III-F2, the majority of total annual nitrogen load occurs during baseflow, not stormflow, conditions.

FIGURE III-F2. Upper Good Hope. Baseflow and Stormflow Comparison for Nitrogen Loads During the Year 2000.

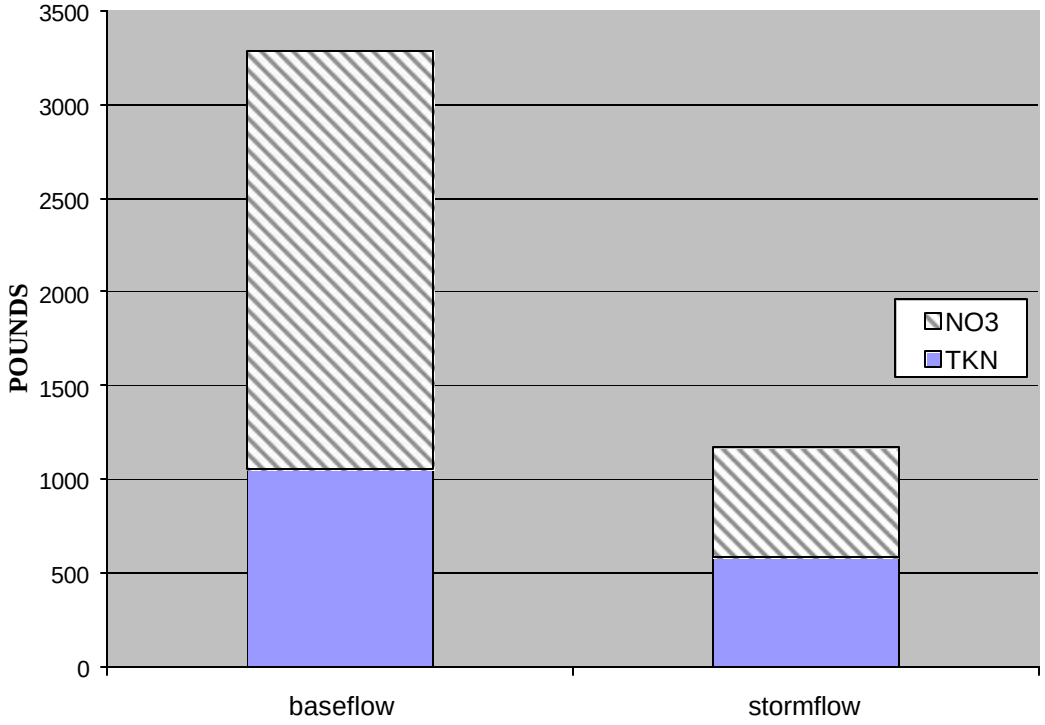


Table III-F2 summarizes the results from both the MBSS and DEP NO3 sampling. The smaller range from minimum to maximum shown in the DEP data may reflect the more limited time period of monitoring (greater range would be expected over greater time period) and also the fact that not all areas of the County were equally represented.

The NO3 distribution across the County using these combined data sets is shown in Figure III-F3. Interestingly, all but one of the lowest *and* highest observations in all three sets of monitoring data came from the Seneca Creek watershed. The exception occurred during 1998, the highest value being 3.2 mg/l NO3 from the Lower Monocacy watershed.

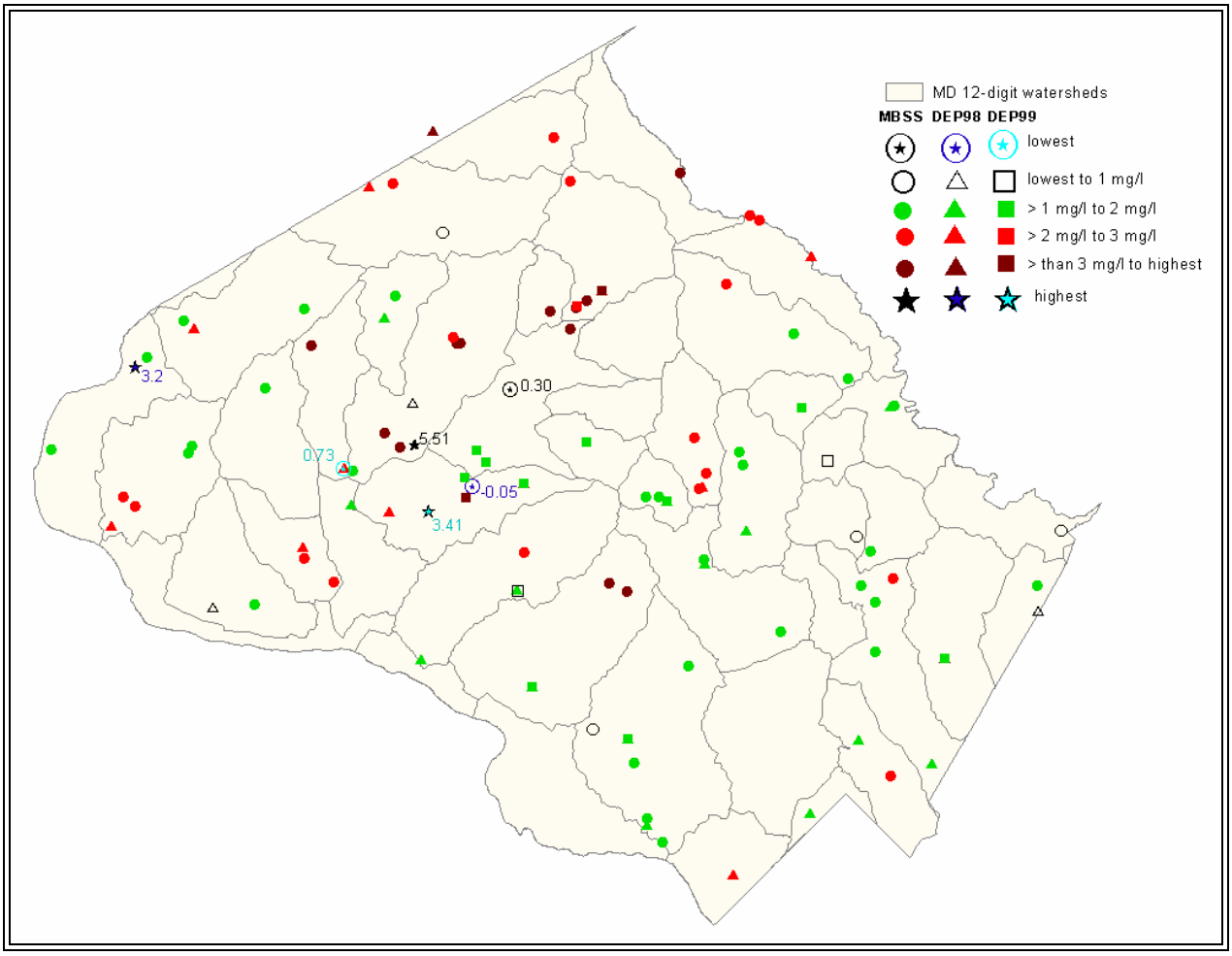
The color coding shows an increase in concentration as colors change from open markers to green, red, and brown in color. Consistently, lower values (open and green markers) occurred in the the southern and eastern, more developed sections of the County, while the highest values (greater than 3 mg/l, shown in brown markers) occurred in the western, more rural and agricultural sections of the County. This pattern has significant implications for targeting strategies across the County to control nitrogen loadings.

No stations monitored in the county from 1994-1999 showed NO3 values above the 10 mg/l drinking water standard. According to the Maryland Department of Natural Resources (DNR), streams with NO3 concentrations greater than 1 mg/l have unnaturally elevated levels. Freshwater streams may show elevated nutrient concentrations but not necessarily effects on the instream biological community because the nutrients are carried out of the system before uptake can occur. However, these elevated levels may contribute to eutrophication and excess algae growth if carried to downstream tidal waters

Table III-F2. Summary of Nitrate (NO3) Results from MBSS and DEP Nutrient Monitoring.

Program and Year	# of stations	Average (mg/l NO3)	Minimum to Maximum (mg/l NO3)
MBSS 1994-1997	91	2.38	0.191 to 5.514
DEP 1998	32	1.94	0.050 to 3.2
DEP 1999	17	1.69	0.730 to 3.41

Figure III-F3. Nitrate (NO3) concentrations from MBSS (1994-1997) and DEP(1998 and 1999) monitoring.



Biological and Physical Habitat Monitoring

The DEP continues its countywide biological and physical habitat monitoring to identify and evaluate water quality problems by subwatershed. In 2002, monitoring was completed at 45 stations in six subwatersheds (Hawlings River, Little Falls, Muddy Branch, Northwest Branch, Potomac River Direct, and Watts Branch) before the record drought reduced streamflows such that many reaches could not be sampled for fish. Eight stations (18%) in four of the six subwatersheds showed impairment in both benthic macroinvertebrate and fish communities. These eight stations, shown in Table III-F3, were identified as impaired from stressors other than could be attributed to habitat conditions alone. Details on the results of monitoring and determination of impairment are presented in the next sections.

The majority of these stations lacked pollution-intolerant benthic macroinvertebrate or fish species. One station in Northwest Branch (NWND201) had only two fish species. This station is located downstream of stormwater retrofits and stream restoration projects that are currently being

constructed and therefore will not be included among those for potential problem source investigation. Two stations in Muddy Branch (MBMB 204 and MBMB 302) were within the City of Gaithersburg limits and results will be forwarded to the City for their follow-up investigation. The remaining five stations (in the Hawlings River, Muddy Branch, and Watts Branch subwatershed) will be further investigated either by staff or as part of the County's illicit discharge identification program for 2003.

Table III-F3. Stations With Possible Impairment by Other Than Physical Habitat Alone.

Watershed/ Station	Location and Possible Causes of Impairment	Follow-up Actions
HAWLINGS RIVER *HWHW209*	Hawlings River Mainstem, Damascus Road (Rte 650). DLF, SSE, and ESC. Infrequent riffles.	Field investigation.
MUDDY BRANCH		
MBMB107	Gravenstein Way. DLF, IWT, AND ESC. Several pioneering fish found – indicator of low stream flow.	Field investigation to determine possible thermal impairment to stream. May be linked to instream pond above site.
MBMB204	Summit Hall Road. DLF, ESC, DBS. High conductivity reading.	Station is within Gaithersburg municipal limits. Refer to municipality.
MBMB302	Upshire Drive. DLF, ESC. High spring conductivity level.	Station is within Gaithersburg municipal limits. Refer to municipality.
MBMB303	Darnestown Road. DLF, ESC. High spring conductivity. No riffle/benthic fish found.	Field investigation to determine sediment impairment.
MBMB309	Turkey Foot Road. DLF, ESC. High spring conductivity. No riffle/benthic fish found.	Field investigation.
NORTHWEST BRANCH *NWND201*	Northwood Terrace. DLF. Banks unstable and sediment problems.	Station is immediately downstream of an on-going restoration project and will be monitored post-construction for improvements.
WATTS BRANCH *WBSB205*	Centurion Way. DLF, ESC. Low dissolved oxygen.	Field investigation.

Winter/Spring **H**igh **F**lows	=	WHF
Summer **H**igh **F**lows	=	SHF
Suspended **S**ediment **E**vent	=	SSE
Drought **L**ow **F**low	=	DLF
Increased **W**ater **T**emperature	=	IWT
Degraded **B**enthic **S**ubstrate	=	DBS
Entrenched **S**tream **C**hannel	=	ESC
Short **T**erm **P**ollutant **E**vent	=	STP
Long **T**erm **P**ollutant Event	=	LTP

Biological Monitoring Results

Hawlings River
Figure III-F4 shows a comparison of the IBIs vs physical habitat. Five stations were rated good to excellent for habitat and biological conditions for both communities. One station, HWHW315, was rated fair for both habitat and biological conditions. Only one station, HWHW209, rated good for habitat but fair for biological condition for both fish and benthic macroinvertebrates and thus may be impaired from other than habitat conditions alone. Examination of the physical/chemical measurements and habitat assessments taken when this station was monitored in 2002 points to sediment pollution as a possible cause of impairment.

Little Falls
Comparison of habitat to biological conditions as shown in Figure III-F5 indicated no impairment from other than habitat problems in 2002. Drought impacts were obvious in Little Falls since two of the upper stations, LFLF102 and 104, could not be fished due to extremely low water levels.

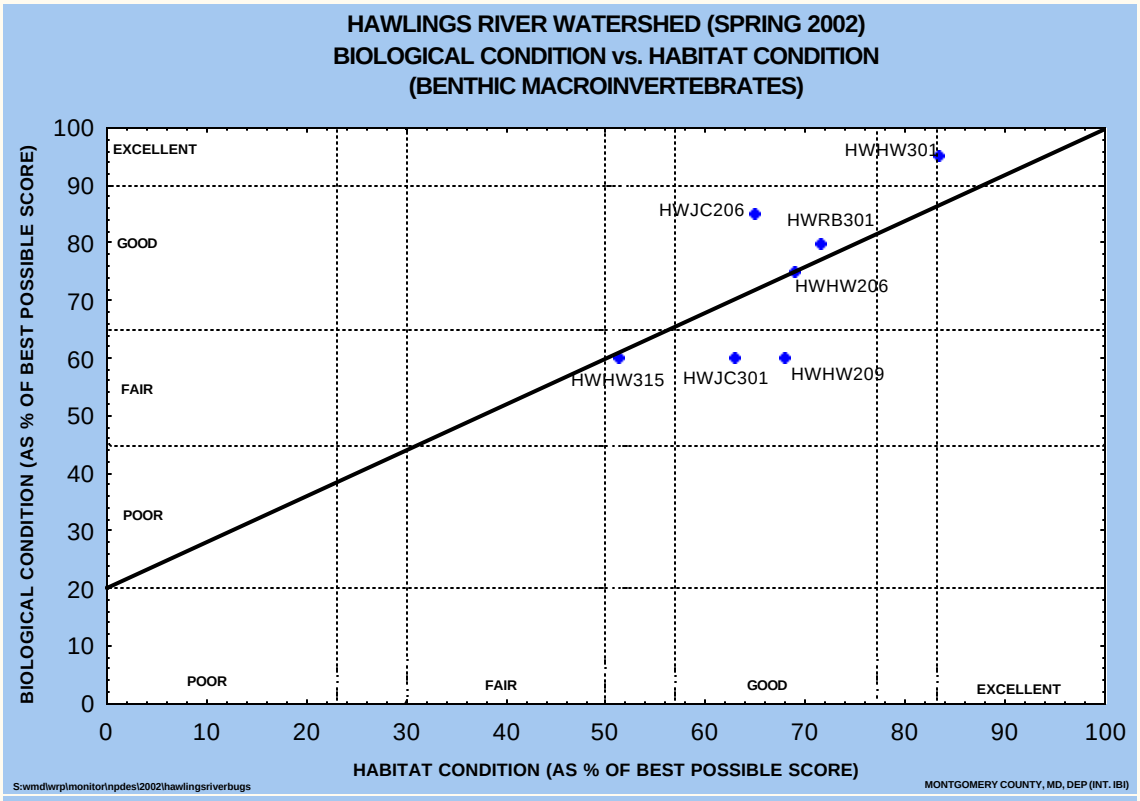
Muddy Branch
Figure III-F6 shows the comparison of the IBIs vs physical habitat for sampled stations during 2002. Muddy Branch also had very low baseflows during the 2002 drought. Three stations, MBMB103, 201, and 207, could not be fished due to low flows, but the benthic macroinvertebrate and habitat conditions rated good to fair. Three other stations, MBMB312, 313, and 314, were rated good to excellent for both habitat and biological conditions. The remaining five stations, MBMB107, 204, 302, 303, and 309, were rated good for habitat condition and poor to fair for biological conditions. These five stations may be impaired from other than habitat conditions alone.

Northwest Branch
As shown in Figure III-F7, 11 of the stations in the Northwest Branch had biological and habitat conditions close to the expected biological vs. habitat line (for both fish and benthic macroinvertebrates). When the habitat condition is in the poor to fair category, then the expected biology condition is also in the poor to fair category. Only one station, NWND201, had both fish and benthic macroinvertebrates conditions in the poor category but with good habitat conditions. This station may be impaired from other than habitat conditions alone.

Potomac Direct
The Potomac Direct stations were also affected by drought- reduced streamflows; no stations were monitored for fish in the summer of 2002. As shown in Figure III-F8, the benthic macroinvertebrate and habitat conditions were both rated good at all three stations.

Watts Branch
Figure III-F9 shows the comparison of biological vs habitat conditions. Four stations, WBWB203, 204, 305, and 310 had the biologicalconditions within the good to excellent range for both fish and benthic macroinvertebrates and also good to excellent habitat conditions. Two stations, WBWB 202 and 303, were rated from poor to fair for both fish and benthic macroinvertebrates, and also for habitat conditions. Only one station, WBSB205, was rated poor for both fish and benthic macroinvertebrates but with good habitat conditions.

Figure III-F4. Hawlings River Watershed



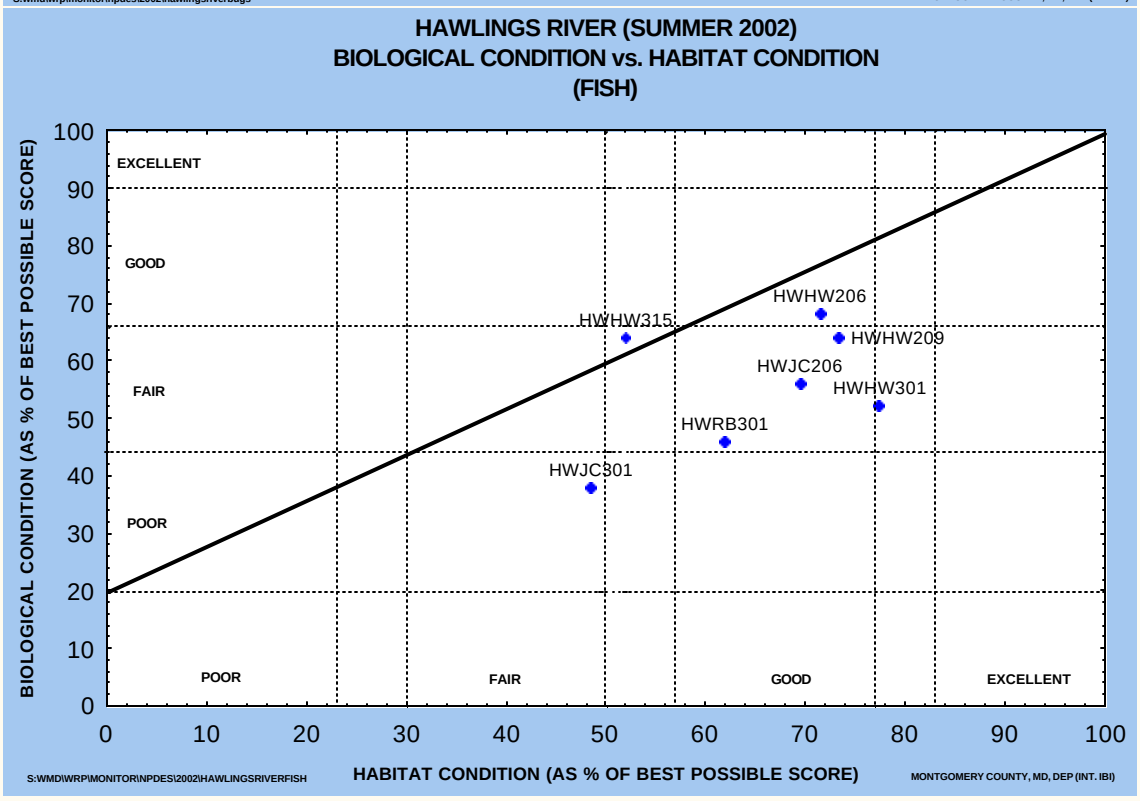
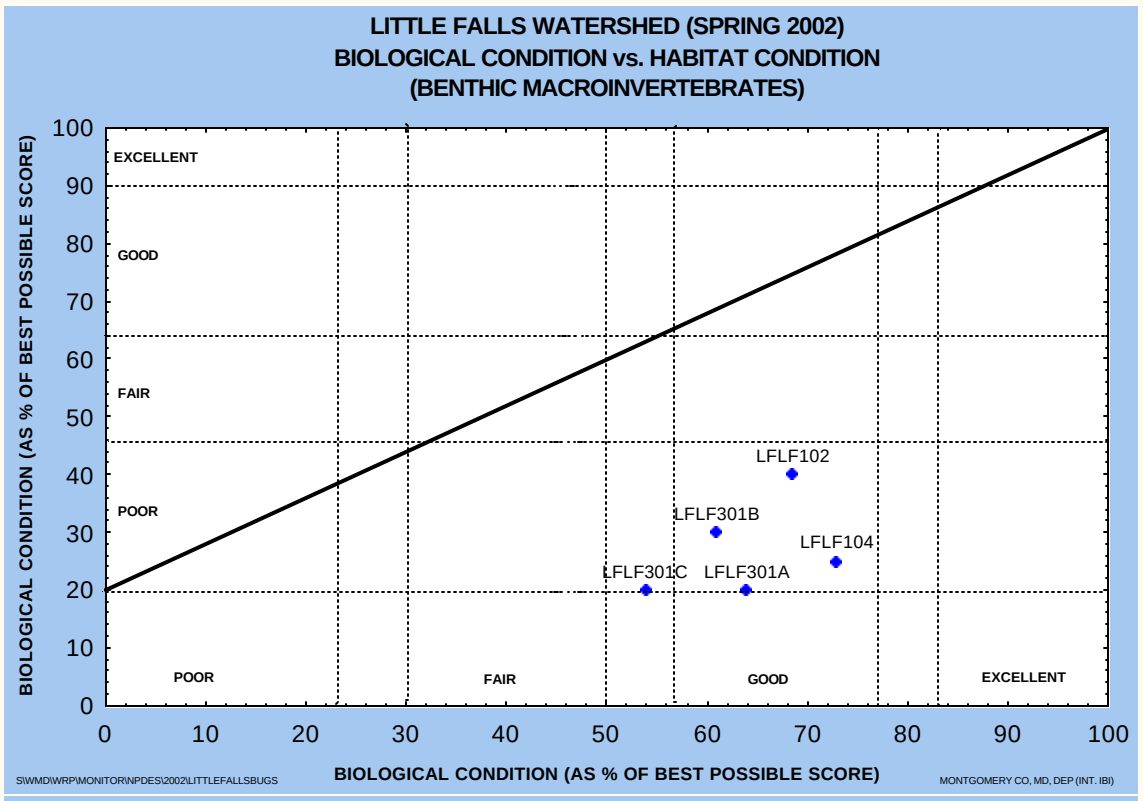


Figure III-F5. Little Falls Watershed



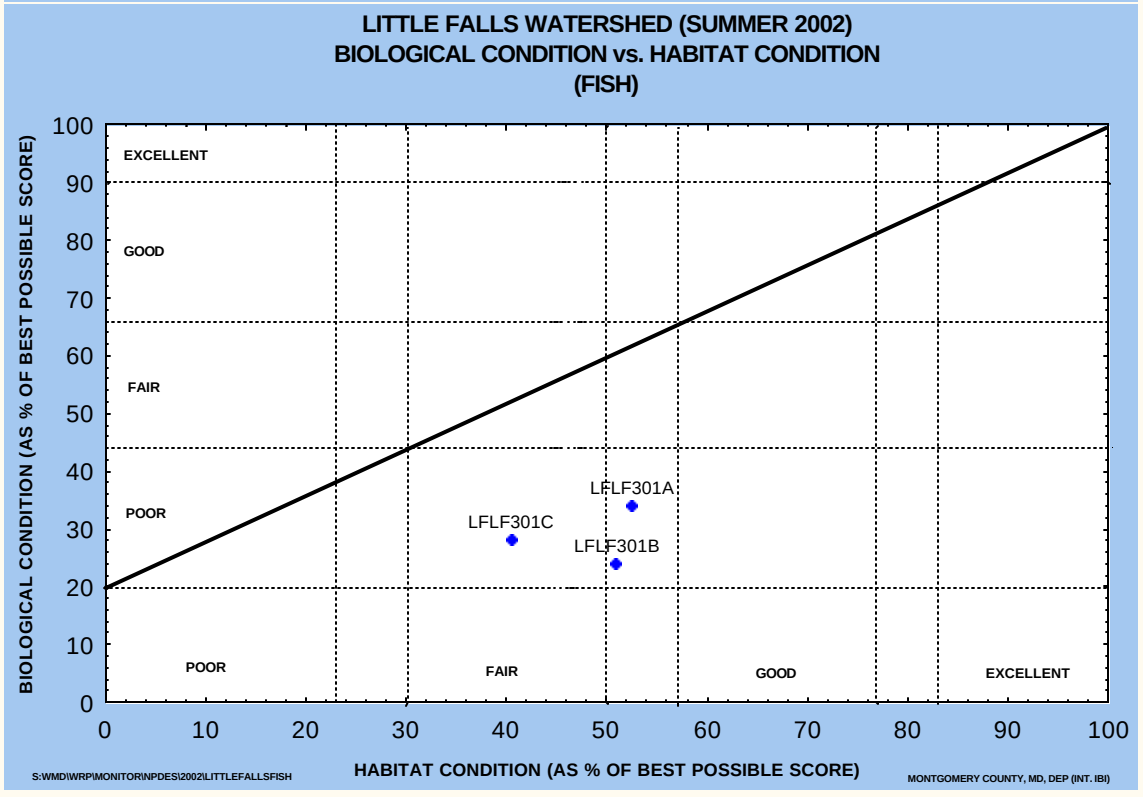
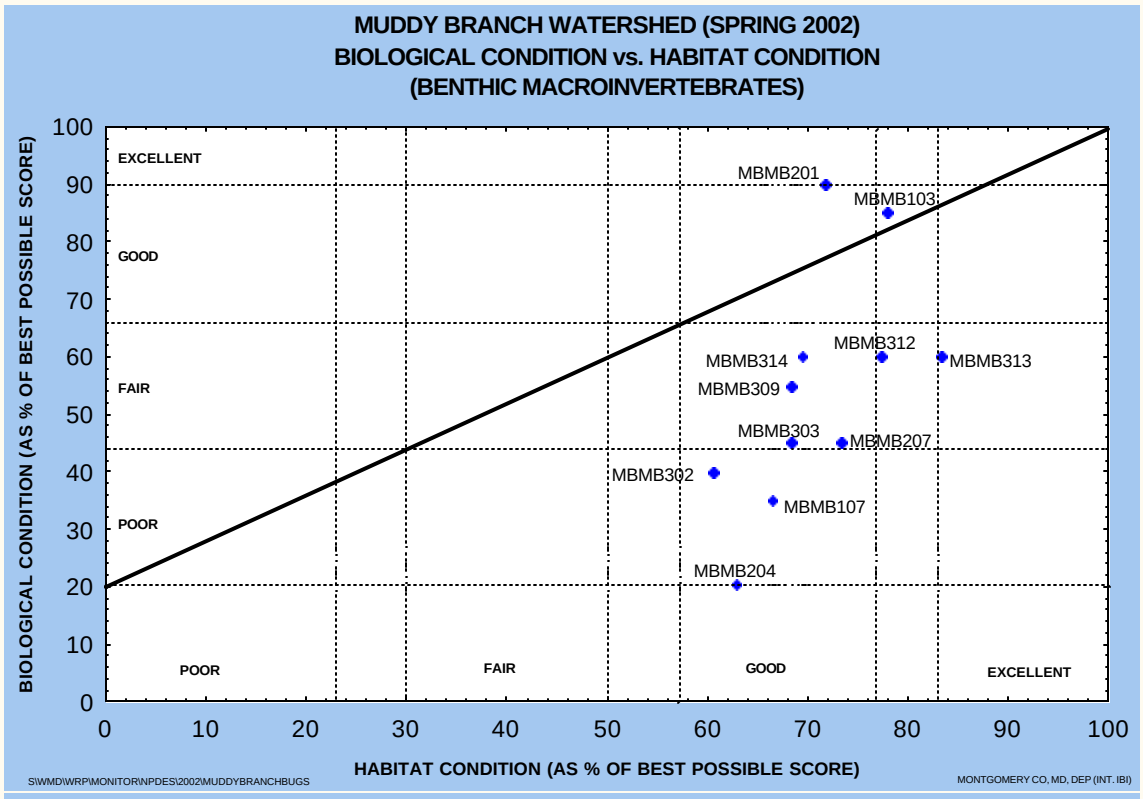


Figure III-F6. Muddy Branch Watershed



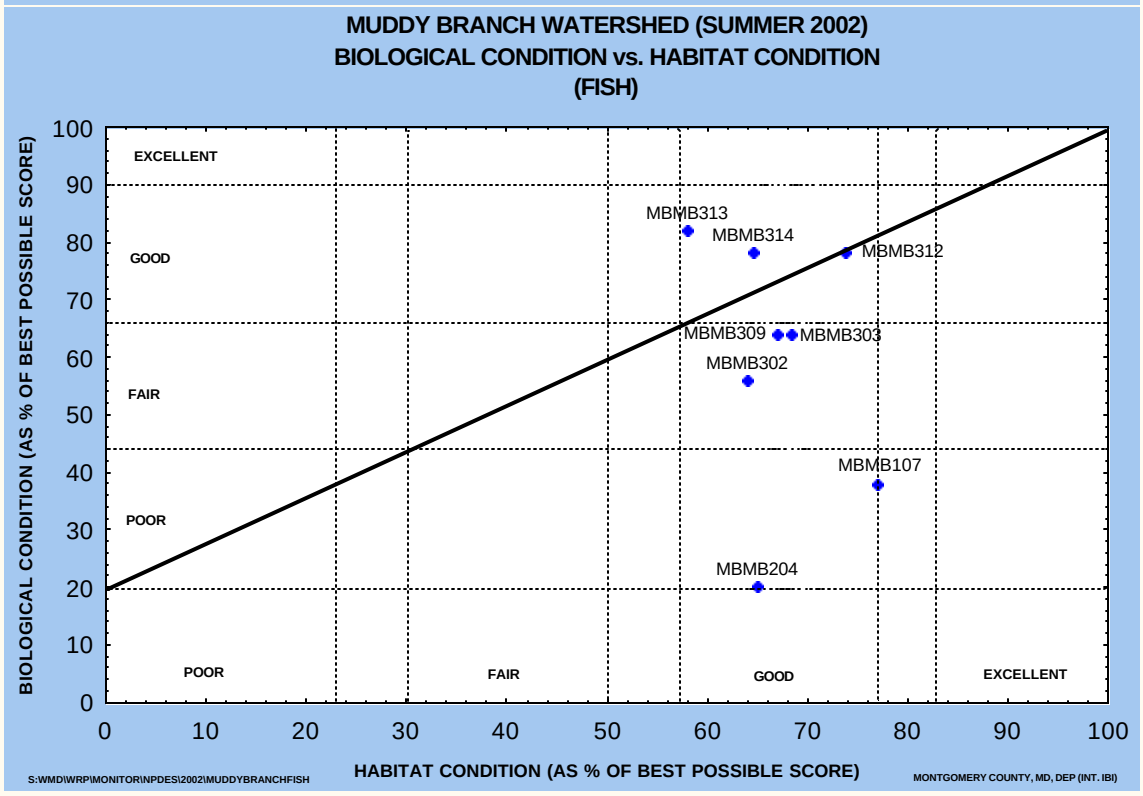
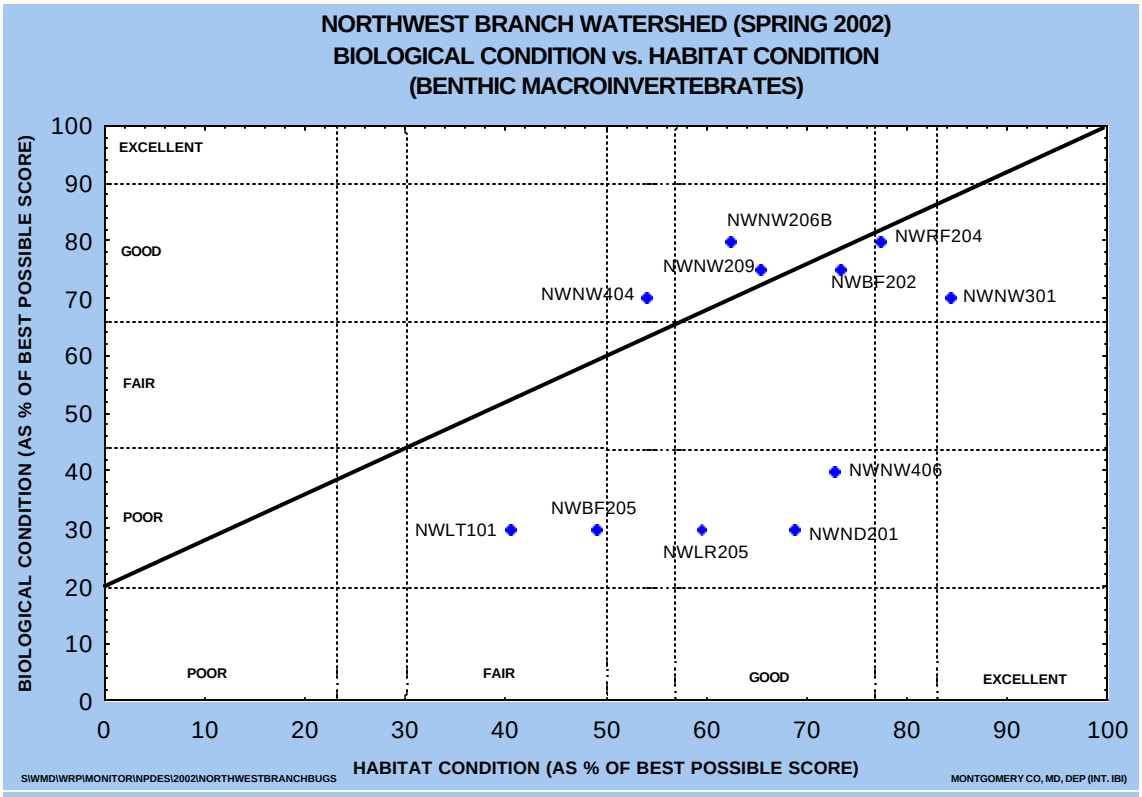


Figure III-F7. Northwest Branch Watershed



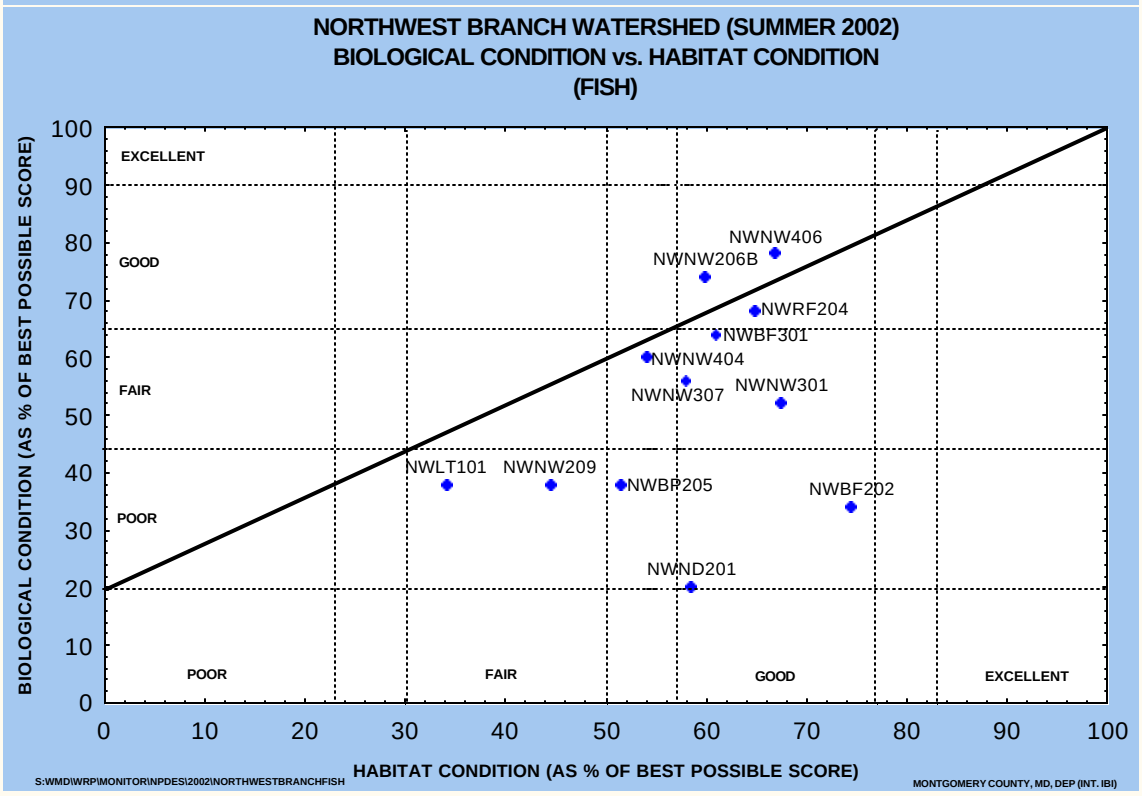
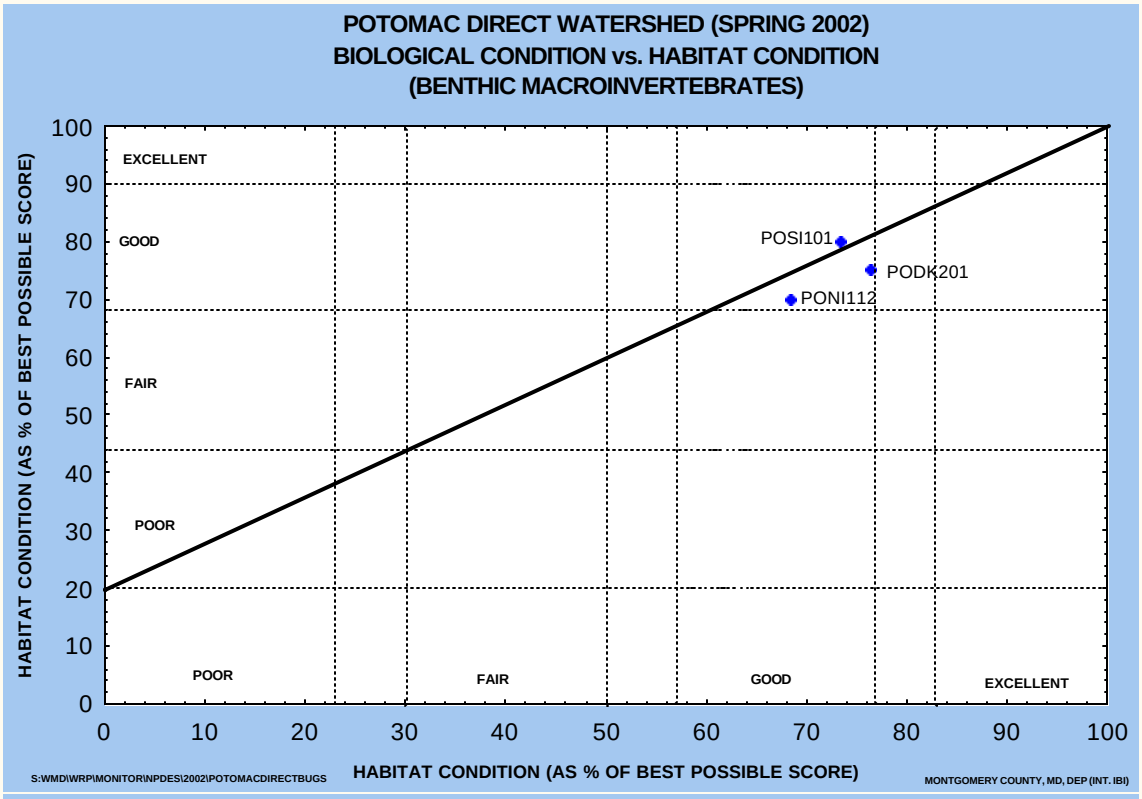
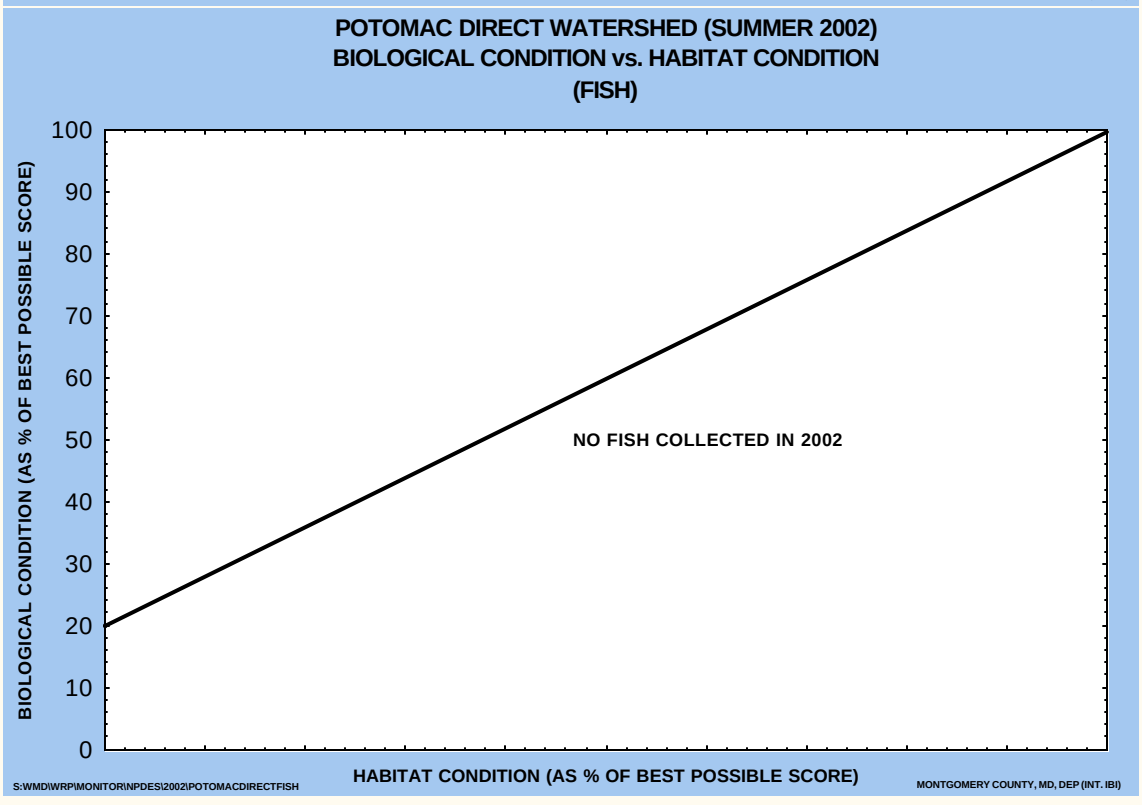
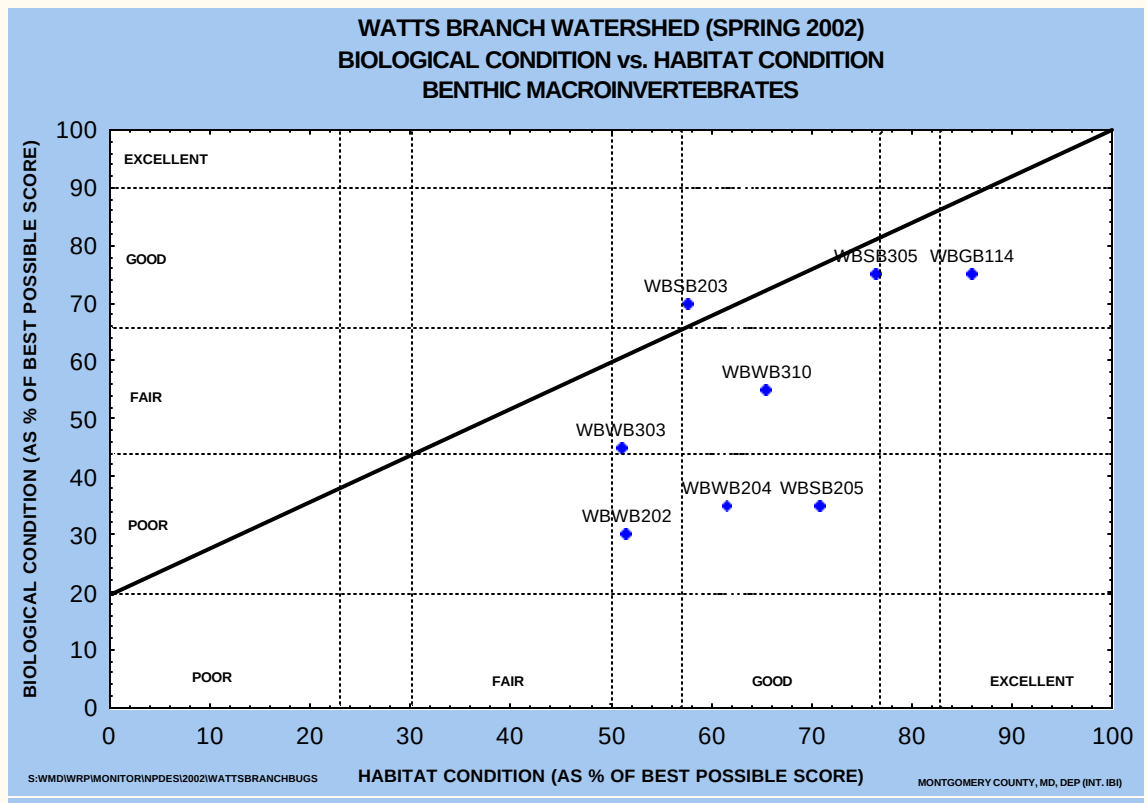


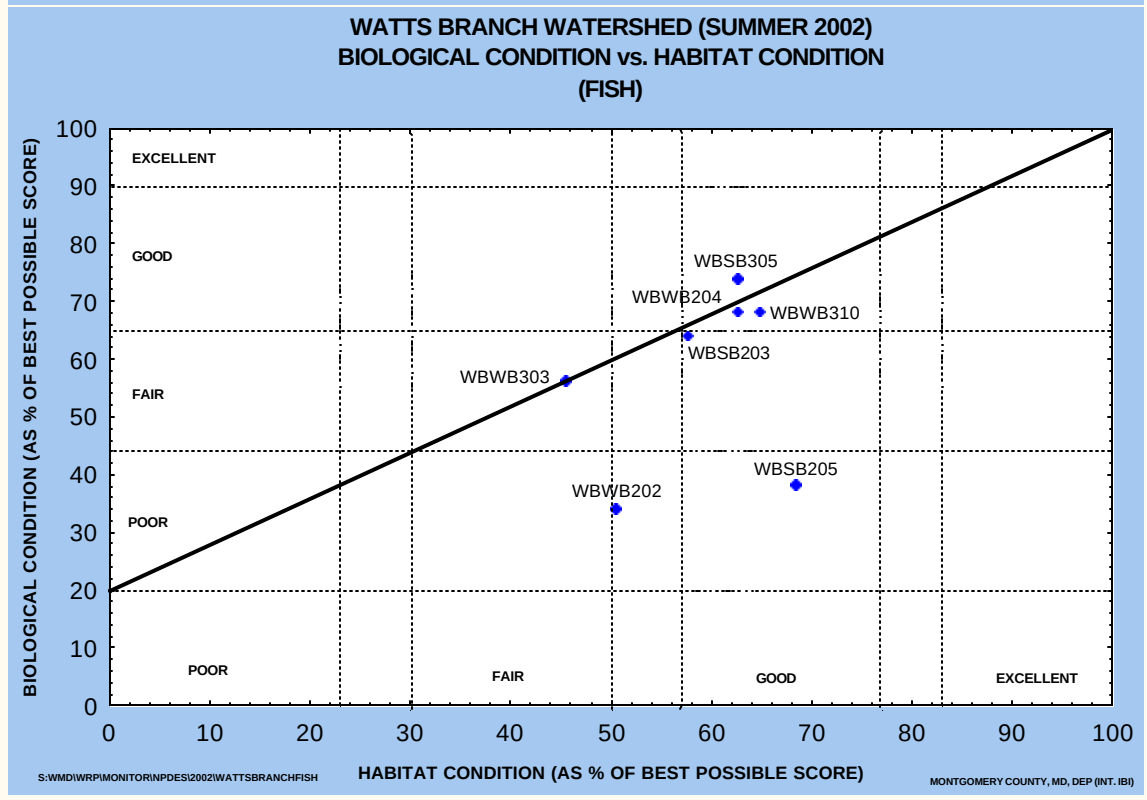
Figure III-F8. Potomac Direct Watershed





FigureIII-F9. Watts Branch Watershed





Results from physical, chemical, and habitat monitoring

Results from the phsyical and chemical monitoring done at the time of the biological monitoring are shown in Table III-F4 for the eight stations identified as impaired by other than physical habitat factors. Results from the Rapid Habitat Assessment (RHAB) are shown in Table III-F5.

In the Hawlings, only station HWHW209 showed possible impairment from other than habitat conditions for both the benthic and fish communitites. Sediment deposition was identified as a possible cause of impairment during the fish community monitoring.

In Muddy Branch, four stations showed possible impairment from other than habitat conditions alone. Water temperatures were extremely high during the spring (25.8 deg C) and summer (25.2 deg C) for MBMB107. Conductivity was high for stations MBMB204 (spring: 571 umhos/cm and summer: 453 umhos/cm), MBMB302 (spring: 452 umhos/cm), and MBMB303 (spring: 426 umhos/cm). Fairly high sediment deposition was reported in the pools and riffles for both MBMB302 amd MBMB 303.

In Northwest Branch, only station NWND201 showed possible impairment from other than habitat conditions alone. Summer dissolved oxygen levels were very low (65% of possible saturation) at this station. Fish habitat, sediment deposition in pools, and channel flow status were also ranked low during the summer visit. Lack of baseflow and low oxygen levels, factors attributed to the drought, are likely to have been primary factors explaining the poor fish community.

In Watts Branch, only station WBSB205 showed possible impairment by other than habitat conditions alone. During the summer sampling, the dissolved oxygen levels recorded here represented very low percent saturation. There were also high sediment levels observed in the riffles. These factors were likely to have affected the fish community.

Table III-F4. Physical and Chemical Monitoring Results at Stations Impaired by Other Than Physical Habitat Alone.

Station	Sample Date	Sample Type	Dissolved Oxygen	Percent Saturation	pH	Conductivity umhos/cm	Air Temp (°C)	Water Temp (°C)
HWHW209	3/21/2002	Benthics	NULL	NULL	7.19	83	20	12.0
	7/12/2002	Fish	8.42	86.0	8.17	77	30	16.4
MBMB107	4/16/2002	Benthics	8.23	100.0	7.99	188	27	25.8
	7/16/2002	Fish	7.65	91.0	7.26	129	35	25.2
MBMB204	4/11/2002	Benthics	8.97	80.4	7.08	571	20	10.0
	7/17/2002	Fish	6.36	72.0	7.36	453	30	21.4
MBMB302	4/11/2002	Benthics	11.43	115.6	7.66	452	22	15.0
	7/17/2002	Fish	6.80	77.5	7.51	290	24	21.8
MBMB303	4/16/2002	Benthics	8.57	91.8	7.57	427	30	19.0
	7/18/2002	Fish	6.75	79.2	7.42	288	NULL	23.3
MBMB309	4/12/2002	Benthics	12.30	116.4	8.19	387	21	14.0
	7/16/2002	Fish	8.14	92.0	7.42	269	28	21.7
NWND201	4/19/2002	Benthics	9.50	104.3	7.11	138	30	20.0
	6/6/2002	Fish	5.88	65.0	6.45	147	29	20.9
WBSB205	4/8/2002	Benthics	12.04	99.1	7.11	345	11	7.5
	7/10/2002	Fish	5.39	61.0	6.90	289	30	22.1

NULL: No reading

Table III-F5: Rapid Habitat Assessment of Stations Impaired by Other Than Physical Habitat Alone.

Highest possible score for Instream Cover, Epifaunal Substrate, Embeddedness, Channel Alteration, Sediment Deposition, Riffle Frequency, and Channel Flows=20. Maximum for other parameters=10.

Station	Sample Date	Type	Instream Cover	Eppifaunal Substrate	Embeddedness	Channel Alteration	Sediment Deposition	Riffle Frequency	Channel Flow	LB Vegetation	RB Vegetation	LB Stability	RB Stability	LB Buffer	RB Buffer
	3/21/2002	Benthics	14	11	6	17	16	9	19	5	5	7	7	10	10
	7/12/2002	Fish	15	15	12	18	9	13	18	8	7	8	7	9	8
HWHW209	COMMENTS	A fair amount of sediment on stream bottom, transported from upstream. Riffles are not that frequent for a small stream. Shrubs and understory not well represented. There is a nearby farm field that is very visible at lower end.													
	4/16/2002	Benthics	9	16	12	19	9	16	17.	5	6	5	7	5	7
	7/16/2002	Fish	15	17	17	16	14	17	14	6	7	6	8	8	9
MBMB107	COMMENTS	At bend, about 3 meters of rip rap; mowed field on left bank.													
	4/11/2002	Benthics	18	16	9	17	10	17	9	6	4	5	4	9	2
	7/17/2002	Fish	16	8	11	18	10	14	10	9	8	7	8	9	2
MBMB204	COMMENTS	Some foot paths on left bank, moved school yard adjacent to stream.													
	4/11/2002	Benthics	13	13	14	19	8	16	8	5	7	2	2	7	7
	7/17/2002	Fish	16	11	9	19	9	8	14	7	7	7	6	8	7
MBMB302	COMMENTS	Foot paths on both banks.													
	4/16/2002	Benthics	11	16	11	19	11	11	13	8	8	6	6	8	9
	7/18/2002	Fish	16	18	9	18	9	13	15	5	5	7	5	8	9
MBMB303	COMMENTS	Path on left bank.													
	4/12/2002	Benthics	18	14	10	19	9	16	14	7	7	4	6	9	4
	7/16/2002	Fish	16	13	14	18	13	9	14	5	7	5	8	7	5
MBMB309	COMMENTS	Road on left bank, farm field on right bank.													
	4/19/2002	Benthics	15	17	10	18	8	18	8	7	7	6	7	9	8
	COMMENTS	Embeddedness-A lot of sand. Channel Alteration-Bridge approximately 5m downstream of 0m. Sediment Deposition-A lot of sand in channel. Riparian Vegetative Zone-Path on RB.													
	6/6/2002	Fish	5	14	12	16	8	17	7	6	6	6	6	8	6
NWND201	COMMENTS	Channel alteration; straight channel; bank veg. prot.; lots of multiflora rose													
	4/8/2002	Benthics	15	17	18	19	9	15	14	5	5	4	5	8	8
	COMMENTS	Riparian Vegetative Zone-Riparian zone is greater than 18m but houses are close by.													
WBSB205	7/10/2002	Fish	15	17	9	19	12	16	12	4	5	5	6	8	9

F2. Selected Restoration Watershed

Restoration Goal

The Permit requires the County to track progress and evaluate effectiveness of implementing programs and projects to restore a drainage area "equaling ten percent of Montgomery County's impervious area that has not been treated to the maximum extent practicable" (10% goal).

In the Annual Report for 2001, the County estimated the amount of its uncontrolled impervious area using an average imperviousness of 20% for developed land acreage (residential, commercial, and industrial) as reported for pollutant loads generation. Using more up-to-date electronic mapping and attribute information now available, a more accurate estimate has been calculated. This is summarized in Table III-F6, which sets an adjusted goal of 1,418.2 acres, slightly more than the 1,398 acres previously estimated.

The adjusted 10% goal is still less than the drainage area of the selected restoration watershed, Turkey Branch, which is about 2,434 acres .A detailed assessment of the selected area and a restoration schedule was submitted in January, 2003 as required in the Permit.

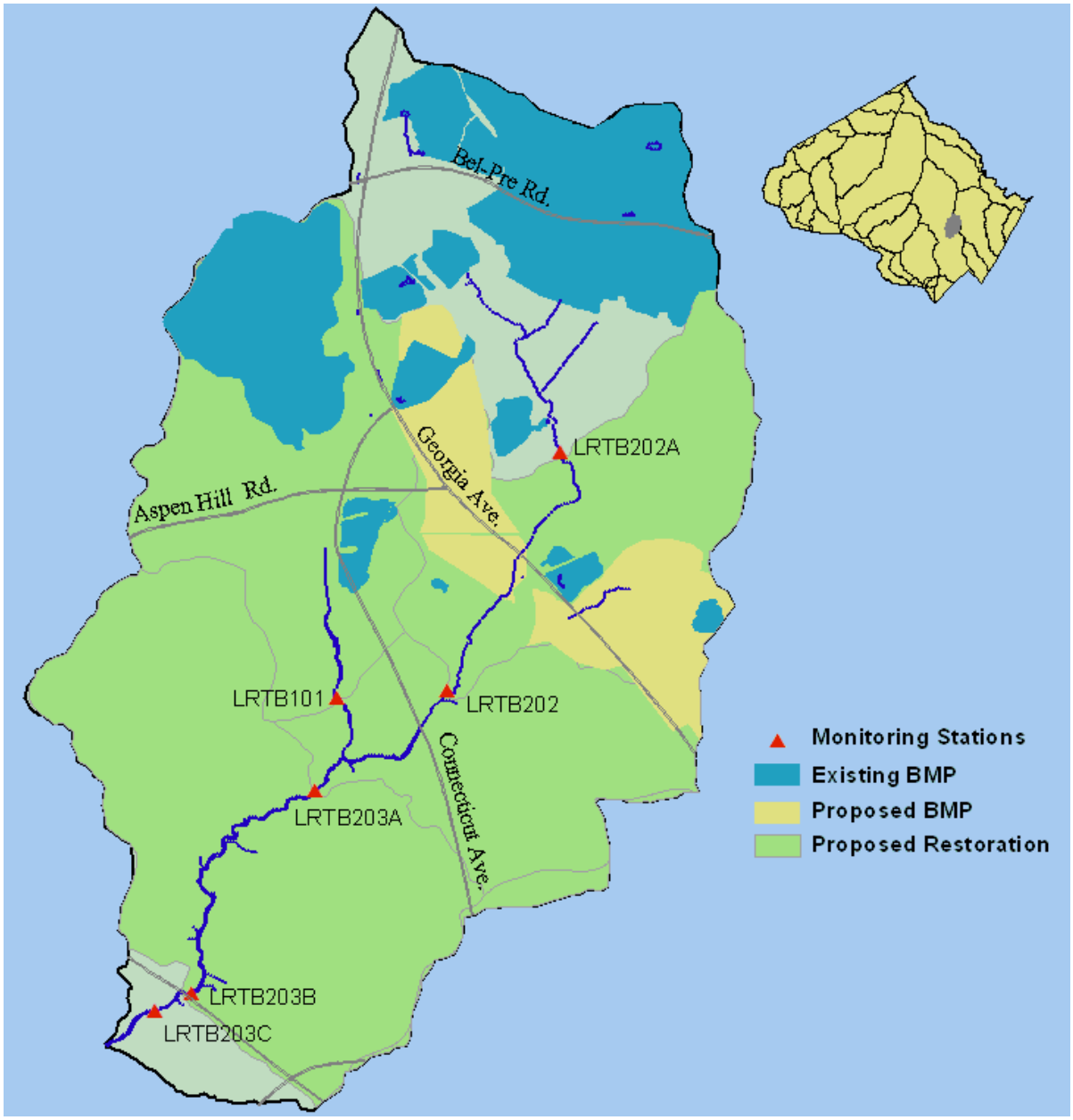
Table III-F6. Impervious Surface Analysis for Watershed Restoration Goal.

Total County Acres	324,552
Total Acres of Impervious Surface	29,127.5
Total Acres of Impervious Surface minus exclusions	14,182.1
10% Goal in Acres	1,418.2
Turkey Branch (Restoration Watershed) in Acres	2,434
Excluded Areas: (total area, not just impervious area, in acres, except for State Maintained Roads)	
Large Federal Properties	3,084
Municipalities with own stormwater management programs: Rockville Gaithersburg Takoma Park	 8,614 6,402 1,335
Rural Zoning (RC, RDT, and RZ)	95,544
Existing Controls: Stormwater BMP Drainage Areas Stream Restoration Drainage Areas *(existing or at 95% design, excluding Turkey Branch)*	 35,706 3,928
State Maintained Roads	464 miles

Monitoring

During 2002, pre-construction monitoring was conducted at six stations in the Turkey Branch watershed. Monitoring was completed for benthic macroinvertebrates, physical/chemical grab samples, and habitat assessments at all stations and for fish at five of the six stations. The reach at station LRTB202A was dry when fish monitoring was originally scheduled so that pre-construction fish monitoring was actually conducted in 2003. Fish monitoring was repeated at LRTB203C in 2003.

Figure III-F10. Turkey Branch Monitoriong Stations. Relative to Existing and Proposed Storm Water Best Management Practices (BMPs) and Proposed Stream Restoration.



The overall watershed stream condition is "poor". Summary scores and narrative ratings for benthic and fish IBIs are provided in Table III-F7. The summary scores provide a means for documenting changes in the benthic macroinvertebrate and fish community as the stream system stabilizes after restoration projects are constructed. The construction of two new stormwater management ponds, the retrofit of another, and restoration along three miles of stream is scheduled to begin in winter/spring 2004. Post-construction monitoring will take place one year, three years, and then five years after completion of the projects to assess changes in stream condition.

Table III-F7. Summary Score and Narrative Ratings for Biological Monitoring in the Turkey Branch Restoration Watershed.(B=Benthic, F=Fish, IBI=index of biological integrity).

Station	Date	BIBI		Date	FIBI	
		Summary Score	Narrative Rating		Summary Score	Narrative Rating
LRTB101	4/17/2002	12	Poor	7/19/2002	1.9	Poor
LRTB202	4/18/2002	14	Poor	7/19/2002	1	Poor
LRTB202A	4/17/2002	16	Poor	7/16/2003	1	Poor
LRTB203A	4/17/2002	18	Fair	7/19/2002	1.7	Poor
LRTB203B	3/22/2002	16	Poor	7/16/2002	1.9	Poor
LRTB203C	4/19/2002	10	Poor	7/24/2002	2.8	Fair
LRTB203C				7/16/2003	2.3	Fair

G. Program Funding

The Permit requires the County to submit a fiscal analysis of its expenditures and maintain adequate program funding to comply with all conditions of this permit. Table III-G1 compares expenditures in FY03 with those budgeted for FY04. The County's fiscal year runs from July 1 of one year to June 30 of the next. Despite the existing and anticipated declines in County general revenues from FY03 and FY04, there is a slight increase in budgeted funding to support Permit-required programs.

The funding under Watershed Restoration for watershed assessments, project identification, and project construction represents the single largest category of total expenditures, about 49% in FY03 and budgeted to be about 36% for FY03. Expenditures for Stormwater Facility Repairs, funded by the WQPC, is expected to increase by 160% from FY03 toFY04 as that program moves beyond first year organization needs.

The rate for the WQPC for FY04 will remain at $12.75 which will be paid by all residential property owners and Associated Nonresidential property owners for maintenance of residential stormwater management structures. In the future, a wide variety of stormwater program requirements could be added for coverage under the Charge, including: inspection and maintenance of the storm drain conveyance system; maintenance of Associated Nonresidential structures; or a credit program where by property owners could receive a credit (i.e. a reduced charge) for implementing nonstructural BMPs.

TABLE III-G1. Montgomery County's Funding for FiscalYears 2003 and 2004 (FY03 and FY04) for Permit-required Programs. ***(CIP=Capital Improvement Project).***

PERMIT CATEGORY	Thousand $s by fiscal year	
	FY03	**FY04**
C. Source Identification Storm Drain Inventory	31*	98
D. Discharge Characterization *Outfall and Instream Station Water Chemistry Monitoring*	50	50
E. Management Programs		
Stormwater/Sediment Control Casework Management	369	394
Plan Review-Stormwater Management and Sediment/Erosion Control	864	924
Maintenance Inspections	989	899
Stormwater Facility Repairs *WQPC*	1,005**	2,729
operating	26	26
DEP Public Outreach and Coordination	333	339
Water Quality Discharge Law Enforcement	246	268
Inspection-Stormwater Managment and Sediment/Erosion Control	945	956
F. Watershed Restoration		
Baseline and Reference Stream Monitoring *(includes integrated Discharge Characterization and Design Manual programs)*	574	572
Countywide Groundwater Monitoring Program	185	262
Watershed Assessments and Action Plans *(includes inventories, planning studies, project design, and construction*): *CIP*	5,395	4,267
TOTAL	11,012	11,784

** Reduced from budgeted $140,000 to meet mandated mid-year reductions.*

*** Reflects establishment of Water Quality Protection Charge (WQPC) to fund phase-in of public maintenance responsibility for privately-owned residential facilities.*

H. Assessment of Controls

The permit requires the County to annually submit estimates of expected pollutant load reductions as a result of its proposed management programs. In previous years, the estimates were calculated using percent reductions by type of facility as shown in Table III-H1. Two reductions were assigned: one for the nitrogen compounds and one for all other compounds, assuming that the behavior of the other pollutants more closely followed that for particulates. These factors were taken from information provided by DPS to the Patuxent Demonstration Project's Urban BMP workgroup in 1994. Five major types of stormwater management facilities were considered: dry ponds, extended detention dry ponds, wet ponds, infiltration structures, and separators/sand filters.

TABLE III-H1. Pollutant Reduction Factors by Stormwater Management Structure Type. Used in County Annual Reports for 1996 - 2001.
(From information compiled by Urban Best Management Practice Workgroup for Patuxent Demonstration Project, 1994).

PARAMETER	Nitrogen: TKN, NO32	All others: TP, CD, CU, PB, ZN, TSS, BOD5
Wet Ponds	0.45	0.60
Dry Ponds	0.10	0.20
Extended Detention Dry Ponds	0.20	0.30
Infiltration	0.60	0.70
Separators/ Sand Filters	0.50	0.55

In January 2002, the CBP's Urban Storm Water Workgroup published new guidelines to increase consistency in reporting and accounting for nutrient reductions from urban storm water management practices. The guidance memo is included on CD in Attachment A. Nine categories were established based upon hydrologic effects and expected pollutant removal efficiency. This included the five major types used in the County's previous annual reports and four categories for which more data is needed to adequately assign nutrient removal efficiencies. In most cases, the CBP removal factors are less than those used in the previous County calculations. Only the reduction factors for total nitrogen (TN) from Extended Detention Dry Ponds and for total phosphorus (TP) for Filtering Practices are higher in the CBP guidelines than previously used.

The DNR's Tributary Strategies Program has adopted these efficiencies for use in calculating nutrient reductions by County. The number and type of existing structures are based on those reported to MDE for MS4 permits and other stormwater management program requirements. Additional information on DNR's assumptions can be found at http://www.dnr.state.md.us/bay/tribstrat/tsdw/index.html.

Table III-H2 compares TN and TP loads and associated information reported in the County's Annual Report for the year 2001 with those calculated using the approach in the Urban Loadings spreadsheet on the DNR web site. In addition to the lower BMP pollutant removal factors, the DNR estimates for number of acres developed and percent of these acres with BMPs are lower while the average loadings per acre are higher than in the County's approach. Both the estimated TN and TP delivered loads are therefore much higher from the Maryland Tributary Strategies program than previously reported using the County's method.

For consistency with the Tributary Strategies process, the County will use the CPB guidelines for removal efficiencies in future pollutant load reduction calculations. However, the County will continue to use the locally-specific pollutant loading factors for uncontrolled watersheds since these more accurately reflect local runoff contributions. As the County's information in the BMP database becomes more complete, particularly for drainage area controlled, the estimates for acres controlled should become identical between the two estimates.

Due to lack of 100% control on new development and the physical and logistic limits on retrofit implementation, pollutant loads from areas in the County controlled by traditional stormwater management practices are unlikely to signficantly decrease. However, stormwater retrofits will continue to be needed because in many areas of the County these represent the only way to get predictable control of stormflow volume and associated adverse environmental impacts.

The CBP identified three categories of urban BMPs (roadway systems, impervious surface reduction, and street sweeping and catch basin inserts) that need quantitative data on average pollutant removal efficiency. Stream restoration is another identified urban BMP type but with monitoring results from only one study being used for pollutant removal efficiency. There will need to be an increased emphasis (and additional studies to quantifying benefits) on these types of BMPs as well as non-traditional and non-structural controls, including urban nutrient management, lawn conversion to native landscaping, and increasing urban tree cover, that eliminate direct runoff to the storm drain system and thus reduce urban stormwater loads.

Table III-H2. Chesapeake Bay Program: Urban Storm Water Best Management Practices Pollutant Removal Efficiencies. January 2002.

PARAMETER	TN	TP	TSS	COMMENTS
Category A. Wet Ponds and Wetlands	30	50	80	Includes practices such as wet ponds, wet extended detention ponds, retention ponds, pond/wetland systems, shallow wetlands, and constructed wetlands.
Category B. Dry Detention Ponds and Hydrodynamic Structures	5	10	10	Hydrodynamic structures are not considered a stand alone BMP. These act similar to dry detention pond and therefore are included in this group.
Category C. Dry Extended Detention Ponds	30	20	60	Includes practices such as dry extended detention ponds and extended detention basins.
Category D. Infiltration	50	70	90	Includes practices such as infiltration trenches, infiltration basins, and porous pavement that reduce or eliminate the runoff. *These efficiencies are based on limited studies.
Category E. Filtering Practices	40	60	80	Includes swales (dry, wet, infiltration,and water quality), open channel practices, and bioretention that transmit runoff through a filter medium. Grass swales were excluded because they have minimal water quality benefits.
Category F. Roadway Systems	TBD	TBD	TBD	Roadways make up a large portion of the urban acreage in the watershed and there are practices currently being used that result in some water quality benefit. Due to lack of data, pollutant removal efficiencies were not assigned to this category but await results from ongoing and future studies to credit these BMPs.
Category G. Impervious Surface Reduction	Model Generated	Model Generated	Model Generated	Includes a number of practices that essentially turn impervious surfaces into pervious surfaces, including green roofs, disconnected rooftop runoff, rain barrels, removal of impervious surfaces. Pollutant load reductions will be modeled based on the conversion of impervious surfaces to pervious urban surfaces.
Category H: Street Sweeping and Catch Basin Inserts	Model Generated	Model Generated	Model Generated	Includes municipal efforts such as street sweeping, catch basins cleaning that prevent pollutant loads from entering the Bay. Reduction efficiences to be provided by jurisdictions with ongoing studies.
Category I: Stream Restoration	0.02 lb/linear ft/yr	0.0035 lb/linear ft/yr	2.55 lb/linear ft/yr	Based on a single study , conducted on Spring Branch Stream, an urban watershed in Baltimore County. The Urban Storm Water Workgroup is working to refine these efficiencies, as more data become available .

TABLE III-H3. Comparison of Stormwater Delivered Loads for theYear 2001 (lbs/year) between the County's Annual Report and the Maryland Tributary Strategies

Annual Report		**TN (lbs/yr)**	**TP (lbs/yr)**
Acres Developed	132,089	1,143,338	109,157
Acres with BMPS	62,203	957,273	84,653
% controlled	47.1	% reduced 16.3	% reduced 22.4
% reduction efficiency		30.2	42.4
average Loading (lbs/acre)		8.6	0.83
DNR Tributary Strategy		**TN (lbs/yr)**	**TP (lbs/yr)**
Acres Developed	120,254	1,063,282	113,619
Acres with BMPS	41,063	994,429	103,865
% controlled	34.1	% reduced 6.5	% reduced 8.6
% reduction efficiency		20.0	30.0
average Loading (lbs/acre)		8.8	0.94

PART IV. SPECIAL PROGRAMMATIC CONDITIONS

The Permit requires that the County assist with the implementation of the Tributary Strategies to meet nutrient reductions goals for the Tributary Basins that it lies within. These are the Middle Potomac and the Patuxent River Tributary Basins. During 2003, the County will continue to participate in the activities of both the Middle-Potomac Tributary Team and the Patuxent River Commission as the Maryland Tributary Strategies are defined to meet and maintain nutrient caps needed to restore the Chesapeake Bay. In response to requests by localities, including Montgomery County, the Maryland allocations for the urban non-point source contributions have been broken out by Basin, by County. Each locality can thus better identify the types of programs and resources needed to meet these allocations.

The DEP has maintained active involvement with the Programmatic Coordination Committee (PCC) of the Maryland Water Monitoring Council (MWMC). Since the year 2000, the PCC has worked on a variety of issues that sometimes simultaneously involve the Bay Program, the Tributary Strategies, and the MS4 Permit program. The presentations and subsequent discussions have led to significant collaboration opportunities. Significant achievements have included:

1. Completing the first round of Monitoring Program Surveys by MWMC members
2. Convincing the CBP Modeling Subcommittee to use locally-collected data to represent urban stormwater loads (working with the Metropolitan Washington Council of Governments).
3. Comparing among NPDES MS4 jurisdictions for required MDE design manual monitoring
4. Suggesting the format for the stream restoration tracking database that is being used by DNR for Bay Program commitments and also evaluating its potential use for MS4 Permit-required watershed restoration tracking
5. Conducting Roundtable Workshop on Annual Monitoring Plans (with Monitoring and Assessment Committee).

The County also continues to participate in the more specific interjurisdictional efforts to protect the Anacostia and the Patuxent Reservoirs Watershed. This has led to cooperative funding for monitoring, modeling, and restoration and retrofit project inventories, design, and construction. The monitoring results are used as part of the countywide screening process. The projects that are being built contribute toward the County's Permit-required watershed restoration goal and also the pollutant reductions that will be needed to meet the Tributary Strategies nutrient caps.